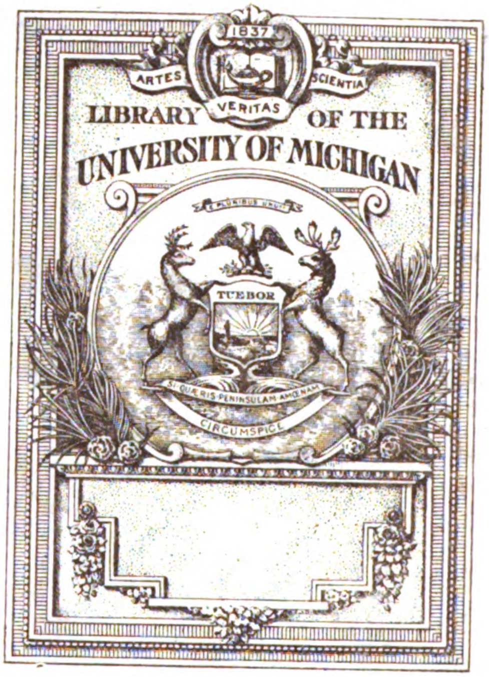

1837
ARTES
VERITAS
SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
E PLURIBUS UNUM
TUEBOR
SI QUÆRIS PENINSULAM AMŒNAM
CIRCUMSPICE

616.5
R39
S67
M5

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER
UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

PART II

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE
SECTION OF THE HISTORY OF MEDICINE   LARYNGOLOGICAL SECTION
MEDICAL SECTION   NEUROLOGICAL SECTION
OBSTETRICAL AND GYNÆCOLOGICAL SECTION

1805-1834
1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

LONDON:
JOHN BALE, SONS AND DANIELSSON, LTD.,
OXFORD HOUSE,
GREAT TITCHFIELD STREET, OXFORD STREET, W.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER

UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

SECTION OF EPIDEMIOLOGY & STATE MEDICINE

1805-1834
1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Section of Epidemiology and State Medicine.

OFFICERS FOR THE SESSION 1915-16.

President—Charles J. Martin, M.B., F.R.S.

Vice-Presidents—

W. H. Hamer, M.D.
G. B. Longstaff, M.D.
J. C. McVail, M.D.
Sir Patrick Manson, G.C.M.G., M.D., F.R.S.
Sir Shirley F. Murphy, F.R.C.S.
A. Newsholme, C.B., M.D.
J. Niven, M.B.
Col. J. Lane Notter, M.D.
Sir Arthur Whitelegge, K.C.B., M.D.

Hon. Secretaries—

G. S. Buchanan, M.D.
William Butler, M.B.

Hon. Secretary for Navy—Fleet-Surgeon P. W. Bassett-Smith, C.B., R.N.

Hon. Secretaries for Army—

Col. R. H. Firth, R.A.M.C., F.R.C.S.
Lieut.-Col. A. M. Davies, R.A.M.C.

Hon. Secretary for Scotland—A. K. Chalmers, M.D.

Foreign and Colonial Hon. Secretaries—

Sir Arthur Whitelegge, K.C.B., M.D. (France).
R. H. Saltet, M.D. (Holland and Belgium).
Frank G. Clemow, M.D. (Russia).
Arthur Shadwell, M.D. (Portugal).
Major F. A. Smith, I.M.S., M.D. (Baluchistan).
Armand Ruffer, C.M.G., M.D. (Egypt and Red Sea).
Professor Kitasato (Japan).
R. Bruce Low, M.D. (South America).
J. A. Lowson, M.B. (China).
F. Tidswell, M.B. (New South Wales).
B. Glanvill Corney, I.S.O. (Polynesia).

Other Members of Council—

E. F. Bashford, M.D.
Edgar L. Collis, M.B.
S. Monckton Copeman, M.D., F.R.S.
F. J. H. Coutts, M.D.
F. G. Crookshank, M.D.
R. Dudfield, M.B.
K. W. Goadby.
E. W. Goodall, M.D.
Major Greenwood, jun.
Surgeon-General W. G. Macpherson, R.A.M.C., C.M.G., M.B.
Charles E. Paget.
Sir Ronald Ross, K.C.B., F.R.S.
J. E. Sandilands, M.D.
F. M. Sandwith, M.D.
W. J. R. Simpson, C.M.G., M.D.
T. H. C. Stevenson, M.D.
C. W. F. Young, M.D.

Representative on Library Committee—E. W. Goodall, M.D.

Representative on Editorial Committee—G. S. Buchanan, M.D.

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE.

CONTENTS.

November 26, 1915.

PAGE

An Analysis of Gloucestershire Statistics, 1901-10. By J. MIDDLETON MARTIN, M.D. 1

Studies on Egyptian Sand Amœbæ. (*Communicated and taken as read.*) By Lieut.-Colonel Sir RONALD ROSS, K.C.B., F.R.S., R.A.M.C.(T.F.), and Captain DAVID THOMSON, R.A.M.C.(T.), M.B. 33

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

LONDON:
JOHN BALE, SONS AND DANIELSSON, LTD.,
OXFORD HOUSE,
GREAT TITCHFIELD STREET, OXFORD STREET, W.

Section of Epidemiology and State Medicine.

President—Dr. C. J. MARTIN, F.R.S.

November 26, 1915.

An Analysis of Gloucestershire Statistics, 1901-10.[1]

By J. MIDDLETON MARTIN, M.D.

INTRODUCTION.

THE results of various inquiries as to the geographical distribution of disease have appeared from time to time, but, so far as I am aware, no complete analysis of the structure of death-rates in county areas has been published. During the past fifteen years I have received returns of deaths, first as Medical Officer of Health for the districts in the Stroud Union, and during the last thirteen as Medical Officer of Health for the county, and as it seemed unfortunate not to make some detailed use of the mass of information received other than the general summary which appears in the routine reports, I have endeavoured in the following notes to lay the foundation for an analysis of the structure of Gloucestershire death-rates which may form the basis of inquiry when statistics for a longer period than ten years are available for the same areas. To my mind, the results are disappointing and scarcely commensurate with the labour necessarily expended, but such as they are I have the honour of presenting them to you, in the hope that from your kindly criticism I may learn in what directions I may look with greater advantage in the future.

The general scheme of my inquiry is as follows: After a brief comparison of Gloucestershire rates with those of a few other counties and of the country as a whole, I give a general description and comparison of the circumstances and detailed death-rates of the districts in the county and of the parishes in the Stroud Union, with the highest and lowest general rates. The chief result thus obtainable was to show that the structure of the death-rate was such a complex matter that it was almost impossible to draw any conclusion except that for reliable results as to cause and effect a consideration of the smallest practicable areas is essential. I next consider ten diseases and groups of diseases, and endeavour to ascertain what characteristics, if any, are common to those with high and low rates. Lastly, I roughly group the districts and parishes according to subsoil and elevation and compare the death-rates from certain diseases. Finally, from such evidence as I was able to deduce, I have ventured, with some diffidence, to draw certain conclusions which appeared to be suggested as a result of my analysis of Gloucestershire statistics for the decennium 1901-10.

---

[1] The maps, charts, &c., illustrating this paper have been bound and preserved for reference in the Library of the Society.

The summaries of the circumstances and proportionate deaths are given in Table I for the sanitary districts in the county, and in Table II for the parishes in the Stroud Union (*see* pp. 28-31).

STRUCTURE OF DEATH-RATES.

The total death-rates for the sanitary districts in the county have been corrected for the age- and sex-distribution of the population by means of the standardizing factor given by the Registrar-General. With one exception (Kingswood Urban District) the effect of this correction has been to decrease the recorded death-rate, in one district to the extent of nearly one-fourth. Taking the average for the whole county as 100, that for urban districts is 108 and for rural districts 96. The districts with the highest and lowest corrected rates are:—

HIGHEST.	Rate	LOWEST.	Rate
Tewkesbury B.	15·08	Chipping Sodbury R.D.	10·77
Tetbury U.D.	13·82	Stow-on-the-Wold R.D.	10·66
Stow-on-the-Wold U.D.	13·51	Faringdon R.D.	10·46
Kingswood U.D.	13·45	Newent R.D.	10·43
Awre U.D.	12·77	Gloucester R.D.	10·41
Warmley R.D.	12·76	Cheltenham R.D.	10·26
Cheltenham B.	12·71	Pebworth R.D.	9·77
Coleford U.D.	12·71	Tewkesbury R.D.	9·18
Lydney R.D.	12·59	Tetbury R.D.	8·54
East Dean R.D.	12·45		

An attempt has been made to ascertain the reasons of the varying death-rates by breaking up the total death-rate under the headings of certain well-defined diseases and groups of assigned causes of death. The total corrected death-rate for the county was 11·79, that for the whole of England and Wales was 15·20; compared with the country generally, the county had low rates for infections (very low); tuberculosis (pulmonary and other forms), pneumonia (very low); and comparatively high rates for bronchitis and cancer. For the figures enabling me to make this comparison I am indebted to Dr. T. H. C. Stevenson, Superintendent of Statistics, General Register Office, Somerset House. Owing to the kindness of the various County Medical Officers of Health, I am also able to compare in the following table the relative importance of diseases and groups of diseases in making up the total death-rate for certain neighbouring counties and for Norfolk:—

TOTAL DEATH-RATE IN EACH AREA = 100.

	England and Wales	Gloucestershire	Somersetshire	Berkshire	Warwickshire	Worcestershire	Norfolk
Acute infections	(1·23) 8·0	(0·77) 5·7	(0·64) 5·0	(0·73) 5·7	(0·84) 6·4	(0·90) 6·9	(0·77) 5·9
Pulmonary tuberculosis	(1·16) 7·6	(0·86) 6·4	(0·89) 6·8	(0·85) 6·6	(0·77) 5·9	(0·76) 5·8	(0·77) 5·9
Other forms of tuberculosis	(0·50) 3·3	(0·31) 2·3	(0·23) 1·8	(0·26) 2·0	(0·30) 2·3	(0·33) 2·5	(0·26) 2·0
Cancer ...	(0·90) 5·9	(0·96) 7·1	(0·89) 6·8	(0·99) 7·7	(0·81) 6·2	(0·80) 6·1	(1·15) 8·8
Bronchitis ...	(1·17) 7·6	(1·08) 8·0	(1·05) 8·0	(0·95) 7·4	(1·06) 8·1	(1·10) 8·4	(0·97) 7·4
Pneumonia ...	(1·25) 8·1	(0·79) 5·8	(0·72) 5·5	(0·64) 5·0	(0·88) 6·7	(0·80) 6·1	(0·51) 3·9
Violent deaths	(0·47) 3·1	(0·39) 3·0	(0·34) 2·6	(0·32) 2·5	(0·33) 2·5	(0·35) 2·7	(0·29) 2·2
Suicide ...	(0·10) 0·7	(0·10) 0·7	(0·10) 0·8	(0·10) 0·8	(0·09) 0·7	(0·07) 0·5	(0·08) 0·6
Other defined diseases	(1·86) 12·1	(1·04) 7·7	(1·00) 7·6	(1·06) 8·3	(1·48) 11·3	(1·43) 10·9	(0·78) 6·0
Other diseases	(6·72) 43·7	(7·24) 53·5	(7·22) 55·2	(6·89) 53·9	(6·60) 50·2	(6·56) 50·1	(7·54) 57·5
Total death-rate (uncorrected)	(15·36)	(13·54)	(13·08)	(12 79)	(13·16)	(13·10)	(13·12)

Figures in parentheses = rates. Other figures = percentage of total rates.

The above table shows that, in the main, details of the death-rate in Gloucestershire accord fairly well with those in other county areas, the most marked differences being the comparatively high rates for acute infections, premature birth and intestinal affections in Warwickshire and Dorsetshire, for which there are probably local explanations—for example industrial circumstances—and for cancer in Norfolk, which, on the other hand, has a very low rate for pneumonia. I am unwilling at the present stage to attempt to discuss these differences and minor variations, partly because I have not sufficient local knowledge, but mainly on the ground—as I hope I shall show later—that in large areas the local circumstances vary so greatly as in great measure to counteract one another. I include the table, however, to show that there is no very special character in the structure of the Gloucestershire death-rate.

From the above table it will be noticed that rather less than half the death-rate is available for analysis, and that of the deaths due to defined causes bronchitis is in most areas responsible for the largest share. Analysing the death-rates for the individual districts, it is found that a high total death-rate does not necessarily mean that all the constituent rates are also high; perhaps the most striking instance is that while Tewkesbury Borough corrected death-rate from all causes is the highest in the county, the rate for bronchitis is distinctly low. The object of this paper is an endeavour to ascertain whether or not it is possible from available information to throw any light on the conditions causing high and low death-rates in this county, and incidentally on those circumstances which are favourable or unfavourable to the development of certain affections.

COMPARISON OF DISTRICTS WITH HIGH AND LOW RATES.

In the first place the districts with high and low total death-rates will be considered broadly:—

Tewkesbury Borough.—The death-rates for all eight diseases and groups of diseases are above the average (except those for pneumonia, bronchitis, and puerperal conditions), and more particularly for tuberculosis (pulmonary and other forms), infectious and other defined diseases. The high rate for the last group appears to be mainly due to the numbers of deaths from enteritis, alcoholism and cirrhosis of the liver and violent deaths, and that for infectious diseases more particularly to measles and diphtheria. The chief characteristics of Tewkesbury are that it is low-lying, and is an ancient town in which the housing problem presents special difficulties; the percentage of overcrowding (10·5) is the highest in the county, but the average number of persons per house (4·39) is not much above that for the whole county (4·36), and is below the average for the urban districts (4·48). On the other hand, many of the houses are grouped in narrow alleys where light and ventilation tend to be deficient. The subsoil is Keuper Marl, Lower Lias and Alluvium.

Tetbury Urban District.—This is a very small district with a population of only 1,874. In some respects the character of the town approximates to that of Tewkesbury in that it is an old town, and the housing problem is somewhat of the same nature. On the other hand, it stands on a high tableland, the superficial structure being Great Oolite. The death-rates which are particularly high are those for tuberculosis (pulmonary and other forms) and bronchitis and the group of undefined diseases; these raise the total rate to one of the highest in the county, in spite of the fact that the rates for pneumonia, cancer and violence are much below the county average.

Stow-on-the-Wold Urban District.—This is another old small town on a high plateau, also on the Great Oolite, at an even higher elevation than Tetbury. The highest rates are those for tuberculosis, both pulmonary and other forms, but the main factor appears to be that the rates for each disease and group are considerably above the average, though not strikingly excessive; in the group of "other defined diseases," the rates for alcoholism and premature birth are particularly high.

Kingswood Urban District.—Kingswood is a somewhat densely populated district on the outskirts of Bristol, on the Coal Measures; the elevation is comparatively low, ranging from 50 to 100 ft. O.D. The average number of persons per house (4·69) is the highest in the county with one exception, and the percentage of overcrowding (5·5) is also above the average. The uncorrected death-rate is low, but the age- and sex-distribution of the population is favourable to a low death-rate, and when the recorded rate is corrected to make it comparable with that for the country generally it becomes the fourth highest in the county. The rate for pneumonia is the maximum for any district, and that for infectious diseases (especially due to measles, scarlet fever and diphtheria) also one of the highest; the influenza rate, on the other hand, is extremely low. The rates for tuberculosis and bronchitis are also above the average, while that for cancer is very low. In the group of "other defined diseases," enteritis, premature birth and puerperal conditions stand high, whilst the rates for alcoholism and violent deaths are low. The infantile mortality is the second highest in the county.

Awre Urban District.—This is a small technically urban district, but actually of a rural character. Its high position in regard to the death-rate is mainly due to the undefined deaths, and with the exception of comparatively high figures for whooping-cough, alcoholism and violent deaths, the rates for other defined causes are low.

Warmley Rural District.—This district is the most densely populated of the rural districts in the county, the average number of persons per acre being more than double that in any other, and of persons per house the highest for any rural district with two exceptions; its general characters approximate those of the contained Kingswood Urban District. Similarly the rates for the different diseases and groups correspond in the main with those for Kingswood, though with the exception of pulmonary tuberculosis, cancer and the undefined group, the rates are generally lower.

Cheltenham Borough.—The special characters of this town are fully described by Dr. Garrett in his various reports, to which reference should be made. Speaking generally, it is a wealthy residential neighbourhood, with, however, its groups of mean streets; the town stands low, the elevation ranging from 100 to 200 ft. O.D. It lies partly upon the Lower Lias Clay and partly upon beds of sand, the proportions of each being about equal. The population contains a considerable excess of elderly people and the highest proportion of females in the county. Correction is made for the peculiar constitution of the population by means of the standardizing factor, but when thus corrected the death-rate is the seventh highest in the county. The diseases mainly contributing to this result are, in order, other forms of tuberculosis, cancer and pneumonia, the rate for cancer being the third highest; in the "other defined" group, enteritis and alcoholism are considerably above the average. On the other hand, the rate for bronchitis is strikingly low.

Coleford Urban District.—Coleford is a small town with a population of about 2,500, near the centre of the mining district in the Forest of Dean. The high total death-rate is mainly due to the large numbers of deaths from measles, diphtheria, pulmonary tuberculosis, bronchitis, pneumonia, enteritis, alcoholism, puerperal conditions, and premature birth.

Lydney Rural District.—This district occupies the area between the lower reaches of the Wye and the Severn; the variations in level are very great, ranging from 780 ft. O.D. in the north and west to 25 ft. O.D. on the Severn side, along which the bulk of the population lives. The subsoil passes from Alluvium in the east to Old Red Sandstone, Carboniferous Limestone and Keuper Marl in the hilly district. The uncorrected death-rate is not much above the average, but correction for the favourable age- and sex-distribution places the district the ninth in the list. This is mainly contributed to by the high death-rates from influenza, whooping-cough and typhoid fever among infectious diseases; pneumonia, violence, and the undefined group; on the other hand, it has low rates for bronchitis, tubercular diseases and cancer.

East Dean Rural District.—The north-eastern half of the Forest of Dean and the parishes to the north and east form the East Dean and United Parishes Rural District. It is in the main a colliery area lying on the Coal Measures and New and Old Red Sandstone; except for the part bordering on the Severn it is a very hilly district, rising from about 30 ft. O.D. in the riverside parishes to 750 ft. O.D. in the Forest. The factors contributing to the comparatively high death-rate are measles, scarlet fever and diphtheria, pneumonia, and puerperal conditions; the rates for pulmonary tuberculosis, cancer and alcoholism are low.

A short analysis has also been made of the districts with low corrected general death-rates; they are all rural districts.

Chipping Sodbury Rural District.—This is a large rural district, chiefly agricultural with a proportion of mining population in the southern part, and a certain amount of home-made tailoring work. The western part is low and undulating and the eastern hilly, the elevation ranging from 150 to 600 ft. O.D. The chief geological substructures are Lower Lias and Coal Measures. The death-rates for practically all diseases and groups are below the average, for some much below, particularly infections, tuberculosis, cancer and enteritis; on the other hand, the rate for bronchitis is considerably above the average.

Stow-on-the-Wold Rural District.—This is an extensive purely agricultural district on the Cotswold Hills, with stone slate quarrying in one parish. All structures in the Jurassic group, from the Lower Lias to the Great Oolite, are exposed. The rates for most diseases and groups are considerably below the average, particularly bronchitis, tuberculosis, enteritis and violent deaths; for a few other diseases and groups the rates are comparatively high: cancer, whooping-cough and influenza, pneumonia, and the undefined group.

Faringdon Rural District.—The particulars relate only to the one parish of Lechlade, and the numbers are very small. It is an agricultural area on the Oxford Clay; all the rates are very low with the exception of those for diphtheria and bronchitis, which are both very much above the average.

Newent Rural District.—This is another agricultural area, undulating, with elevations ranging from 50 to 550 ft. O.D. The main geological substructures are New and Old Red Sandstone. Most of the rates are considerably below the average, but the undefined group is large, and the rates for pneumonia, influenza and diphtheria are above those for the county generally.

Gloucester Rural District. — This rural district is the residential and agricultural area surrounding the city of Gloucester. It lies low, practically all parts being below 150 ft. O.D., and the bulk below 100 ft. O.D., on Lower Lias Clay and Alluvium. The individual rates are nearly all low, but violent deaths are above, and the rate for bronchitis closely approximates to the average.

Cheltenham Rural District.—The general characteristics of this area, which borders on Cheltenham, are much the same as those of the last district, but the range of elevation is greater, the eastern part reaching up the escarpment of the Cotswold Hills. The geological substructures range from the Lower Lias to Inferior Oolite. The rates also generally approximate, but those for alcoholism and puerperal conditions are higher; other rates exceeding the average are those for bronchitis, influenza, and violence.

Pebworth Rural District.—This is a comparatively small rural district, mainly in the valley, but stretching on the eastern side up the slopes of the Cotswold Hills, the elevation ranging from 150 to 550 ft. O.D. The chief geological substructure is Lower Lias Clay. Generally all the rates are low, but those for diphtheria, measles, whooping-cough, alcoholism, and premature birth are above the average, and that for bronchitis approximates to it; the rate for pulmonary tuberculosis is the lowest in the county, but that for "other tubercular diseases" is about the average.

Tewkesbury Rural District.—This entirely agricultural district surrounds the borough and lies entirely in the Severn Valley, all parts being below 150 ft. O.D. The main geological substructures are Keuper Marl, Lower Lias and Alluvium. With very few exceptions the rates are below the average for all diseases and groups, but those for puerperal conditions, pneumonia, and violence are very slightly above the average; infectious diseases, bronchitis and other tubercular diseases are particularly low.

Tetbury Rural District.—This is a small agricultural district on the Cotswold Hills, the elevation ranging from 300 to 750 ft. O.D., and the chief geological substructures being the Inferior and Great Oolite. Nearly all rates are very low, but that for puerperal conditions is very high, and for bronchitis approximates the average and is proportionately high.

The preceding notes with reference to districts of high and low death-rates have their interest, but cannot be regarded as bringing out much conclusive information. One indication, however, appears to be that high and low death-rates are found both at high and low altitudes, and both on clay and rocky structures. Also—to take one point which seems to be indicated—in those localities where pneumonia is common bronchitis is low and vice versa, though there are marked exceptions—e.g., at Coleford, Stow-on-the-Wold, Cirencester, Kingswood, and in the Campden and Marston Sicca Rural Districts.

The areas covered by the rural districts are large, and there may be greatly varying conditions in different parts, producing different effects which are obscured in the general results. This also applies to variation in the age and sex of the population, for which correction is practicable only with respect to the general death-rate. Unfortunately, information is not generally available whereby the conditions in the county districts can be studied in greater detail, but while holding the position of Medical Officer of Health in the Stroud Districts I kept the records separately for the sexes in each parish and propose now to analyse the results for the Stroud Union in parishes on the same lines as those for the sanitary districts in the county.

COMPARISON OF PARISHES IN STROUD UNION WITH HIGH AND LOW RATES.

In the following table the parishes are arranged in order of total death-rate (uncorrected), taking the average for the county as 100:—

	Both sexes	Male	Female
Horsley	125	115	133
Stroud	107	120	96
Woodchester	105	120	94
King's Stanley	104	110	98
Nailsworth	103	114	95
Painswick	103	115	90
Randwick	103	122	87
Leonard Stanley	102	114	94
Chalford	99	104	96
Bisley	99	92	106
Cainscross	98	90	105
Cranham	97	103·5	91
Minchinhampton	96	100	92
Whiteshill	94	87	99
Stonehouse	92	94	90
Thrupp	91	103	81
Pitchcombe	89	112	67
Rodborough	86	97	76
Uplands	82	95	74
Miserden	67	62	71
Stroud Union	99	105	94

This table appears to render it possible to make the general statement that for small areas the total death-rate is principally influenced by the male death-rate, and that if the latter is high the total death-rate will be high. Thus the eight parishes with the highest total death-rate are the eight with the highest male death-rates (except for the small parish of Pitchcombe), but include only four of the eight parishes with female death-rates above the average.

Some of these parishes will now be considered in detail to analyse the influences determining their position in the table. It may, however, be first remarked that the position of habitations appears to have been largely determined by the points at which springs issue and a water supply would be readily available; thus over one-third of the houses are grouped on the Lias Sands.

Horsley stands fairly high, about two-fifths of the houses standing on the Inferior Oolite, and the majority of the remainder on the Fuller's Earth and Great Oolite above. It is mainly an agricultural parish. The death-rates for males and females are both very high, the latter being the highest in the Union; most of the individual rates also are high, the most marked exceptions being the low female rates for pneumonia and infectious diseases. The proportion of deaths attributed to old age is the highest in the Union.

Stroud is a populous town with the bulk of the population on a shoulder of the Cotswold Hills. The main geological substructures are the Middle Lias up to the Inferior Oolite, most of the houses being in the neighbourhood of the Lias Sands. The chief industry is the making of ready-made clothes. The female death-rate is not greatly above the average, but the male death-rate makes the total the second highest. The chief causes are pulmonary tuberculosis (males), other tubercular diseases (both), and pneumonia (males).

Woodchester is a straggling parish on a slope of the Cotswolds facing east. Many of the inhabitants work in cloth mills and in a pin mill. Most of the houses are grouped round springs in the Lias Sands, at an elevation of 150 to 300 ft. O.D. The female death-rate is just the average, and the high place for this parish is due to the high male death-rate. The diseases contributing to this result are chiefly bronchitis and cancer, for which death-rates Woodchester heads the table for males; the female rate for cancer is also high, but that for bronchitis is considerably below the average. The rates for pulmonary tuberculosis (females), nephritis (males and females), old age (females), are also above, while those for infectious diseases (male and female) and premature birth are below the average.

King's Stanley lies on the other side of the same hill as Woodchester with a north-westerly aspect, the population aggregating in two chief centres, one between 150 and 200 ft. O.D. and one between 350 and 400 ft. O.D. The inhabitants are also engaged mainly in textile work. The lower village is on the Lower Lias Clay and the upper on the Lias Sands. There is no disease or group with extremely high rates for both sexes, but the male rates for pneumonia, bronchitis, cancer, and infectious disease are in the highest group, and also the female lobular pneumonia rate. The relative position of this parish appears to be due to the comparatively high rates for most of the diseases and groups.

Nailsworth is a compact little market town at the junction of several minor valleys in a large valley in the Cotswolds, with outlying hamlets on the hillsides of the valleys; the bulk of the houses lie between 200 and 400 ft. O.D. (though there are many above and below) on the Lias Sands. Textile work is the main occupation, but many persons are engaged in the metal works and leather-board factory. The only excessively high rate is that for other defined diseases amongst males, the chief contributing causes being nephritis and deaths from violence. Other comparatively high rates are those for cancer, bronchitis, old age (both male and female), whilst those for infectious diseases, tuberculosis, pneumonia, and enteritis (male and female) are low.

Painswick is a very extensive parish on the sides of a minor valley in the Cotswolds, facing, in the main, south-east, including the small town of Painswick and the villages of Sheepscombe and Painswick Slad. The greater part of the inhabitants live at an elevation of from 400 to 550 ft. O.D. on the Lias Sands. Agriculture is the main occupation, but the pin mills in the valley also employ many persons, including women. One disease contributing to the high death-rate is bronchitis, the rate for which is the second highest in the district; the rates for the group of undefined diseases, infectious diseases, and pneumonia are also above the average, the last for both sexes separately, infectious diseases and the undefined group among females being below the average. The only extremely low rates are those for other tubercular diseases, violence and alcoholism. The rates for cancer and pulmonary tuberculosis are below the average, the latter markedly so for females and the former among males.

Randwick lies in a combe on the southern slope of the main valley, at an elevation of 450 to 550 ft. O.D., chiefly on the Lias Sands. The main industry is textile. The death-rates for tuberculosis (pulmonary and other forms), pneumonia (lobular), enteritis and puerperal conditions are among the highest in the Union, while all other rates are below the average, and that for infectious diseases one of the lowest. The total male rate is the highest for any parish, principally owing to tuberculosis and pneumonia, but also to rates above the average for other conditions except cancer and bronchitis, which are below the average; the total female death-rate, on the other hand, is low (even though the tubercular [pulmonary and other forms] is very high), owing to the low rates for other disease groups, particularly pneumonia, cancer, and infectious diseases and the other defined group.

As regards the parishes with low general death-rates there is not much to be said, except that, while some have rates above the average for certain diseases—e.g., pulmonary tuberculosis in The Thrupp, tuberculosis and infectious diseases in Rodborough, pneumonia and cancer in Uplands—these higher rates are more than compensated by the low rates for other conditions. When the analysis is carried a little further, it is found that maximum rates occur even in these parishes for the sexes separately—thus for pulmonary tuberculosis in The Thrupp, cancer and influenza in Miserden, and for bronchitis in Pitchcombe, amongst females; and for tuberculosis in Uplands, Rodborough and Stonehouse, pneumonia at Pitchcombe and Miserden, and cancer in Uplands, among males. Of the six parishes, three are situated at a low elevation, one fairly low, one fairly high, and one very high; one stands on the Lower Lias, three on the Lias Sands, and one on the Great Oolite.

The above statement shows how complex is the problem of analysing death-rates and endeavouring to draw conclusions as to cause and effect. The complexity is increased from the unreliability of small figures unless these can be confirmed by repeated observations. On the other hand, if very large populations are dealt with it is even more difficult to differentiate amongst the increased number of disturbing factors and obtain more or less homogeneous groups living under approximately the same conditions. The latter is reasonably practicable in small areas, and it remains to be seen whether the desired confirmation can be found.

In one direction this can be tested by comparing the rates for 1901-10 in the parishes in the Stroud Union, to which reference has been made in the preceding paragraphs, with those for 1891-1900, which I extracted from the registers of deaths and worked up on somewhat different lines. The diseases considered in the earlier period were cancer, pulmonary tuberculosis, other tubercular diseases, lobar and lobular pneumonia; and for our present purpose probably the most useful comparison will be to show the numbers of parishes with rates above the average in the earlier period amongst the ten which had high rates in the later period, and this is done in the following table:—

TABLE SHOWING THE NUMBERS OF PARISHES WHICH WERE AMONG THE HIGHEST TEN BOTH IN 1891-1901 AND 1901-10.

	Male	Female	Both sexes
Cancer	6	6	7
Pulmonary tuberculosis	4	5	5
Other tubercular diseases	4	7	6
Lobar pneumonia	6	7	5
Lobular pneumonia	8	7	6

If the comparison is pushed much further considerable differences are found, but on the other hand, striking examples of similar positions are noticed—e.g., the male and total death-rate for cancer in Woodchester is the maximum in each period, and the female is third and fourth respectively; Stroud and Rodborough are second and sixth respectively in each period for pulmonary tuberculosis; Randwick heads the list for males and both sexes together for other tubercular diseases in both periods, and is second and third with respect to females. Another manner of testing the reliability of the rates is to arrange the areas in order of the rates for different diseases and see whether or not the general characters obtain in districts with similar rates, and if so, to determine which are the effective characters in each case. This line of analysis will now be followed with respect to (1) sanitary districts in the county; (2) parishes in the Stroud Union. Charts for this purpose have been prepared and maps have been coloured to represent death-rates from five diseases in proportion to the rates for the County or Union, as the case may be, taken as 100.

DISTRIBUTION OF DISEASES.

Pulmonary Tuberculosis.

The districts with the highest and lowest rates are, in order:—

HIGH.

District	Rate	Percentage of over-crowding	Average number of persons per house	Elevation, feet O.D.	Geological substructure
Tetbury U.	1·60	4·8	3·95	350-400	Great Oolite
Stroud U.	1·44	4·6	4·33	125-500	Lias to Inferior Oolite
Stow-on-the-Wold U. ...	1·34	2·3	3·90	700-750	Great Oolite
Tewkesbury B. ...	1·27	10·5	4·39	35-150	Marl, Lias, Alluvium
Westbury-on-Severn U.	1·14	4·1	4·53	20-125	Keuper Marl, Lower Lias
Stroud R.	1·12	4·4	4·01	75-860	Lower Lias to Great Oolite
Charlton Kings U. ...	1·11	2·3	4·11	275-400	Lower Lias

LOW.

District	Rate	Percentage of over-crowding	Average number of persons per house	Elevation, feet O.D.	Geological substructure
Chipping Sodbury R. ...	0·65	5·3	4·31	150-600	Coal Measures, Lower Lias
Newnham U.	0·63	2·1	4·08	20-200	Keuper Marl
Newent R.	0·63	4·7	4·27	50-550	New and Old Red Sandstone
Cheltenham R. ...	0·57	2·9	4·29	138-984	Lower Lias to Inferior Oolite
Faringdon R.	0·51	3·7	4·35	235-300	Oxford Clay
Tetbury R.	0·47	8·1	4·37	300-750	Inferior Great Oolite
Pebworth R.	0·42	5·2	4·38	150-550	Lower Lias

Comparing the characteristics of these two groups it does not appear that elevation has much effect, as that of the high group is, if anything, slightly above that of the low group; also, soil appears to have little influence, as quite as many, if not more, of the low group stand on clays as in the high group. Curiously enough, too, the average number of persons per house and the percentage of overcrowding are slightly higher in the low than in the high group. On the other hand, the low group consists almost entirely of purely agricultural districts, while the former includes manufacturing areas—e.g., Stroud Urban and Rural Districts and Tewkesbury Borough; Tetbury and Stow-on-the-Wold are small centres in agricultural areas; Westbury-on-Severn is an agricultural parish, and Charlton Kings a residential neighbourhood. The one thing in common with the four first districts in the list is difficulty in housing conditions.

An examination of the map shows (1) a comparatively high incidence in the Severn Valley with the exception of the area between Gloucester and Tewkesbury, and a fairly low incidence in the Forest of Dean to the west and the Cotswold Hills to the east, with the exception of the Winchcombe Rural District and the Urban Districts of Cirencester, Stow-on-the-Wold and Tetbury. This general survey appears to confirm the common view that low-lying localities are favourable for the development of pulmonary tuberculosis, but there are many exceptions.

(2) *Parishes in Stroud Union.*—There is little indication that elevation alone has a very direct favourable effect; indeed, in the map for the female death-rate the incidence increases as the elevation increases from west to east. Also the fairly high-lying Cranham and Randwick have high female rates, while, on the other hand, the comparatively high-lying parishes of Painswick, Miserden and Minchinhampton have low female rates. In this map there is some suggestion of the conclusion so carefully worked out by Dr. W. Gordon, of Exeter, for the County of Devon, confirmed by local observations in Exeter and records from various parts of the world, that " prevalence of strong rainy winds appears to be remarkably associated with increased prevalence of phthisis, whilst absence of such winds seems to correspond with rarity of phthisis," for the south-west winds bringing rain sweep up the Stroud Valley, and the rainfall increases from Stonehouse up to Cranham. On the other hand, "protected" Horsley has the highest rate, and more or less "exposed" Painswick and Cranham low rates; not that these observations controvert Dr. Gordon's theory, but they need explanation.

The physiographical circumstances of the county do not lend themselves readily to a classification of exposed and protected districts, but there appears to be little to suggest any direct effect of "strong rainy winds," and the only conclusions I can venture to draw from this and my previous research are:—

(1) From the fact that the death-rate from all causes less pulmonary tuberculosis follows the same general tendency as the death-rate from that disease, the factors favouring a high general death-rate and a high pulmonary tuberculosis are the same.

(2) The death-rate in agricultural districts tends to be low.

(3) As regards elevation, within certain limits moderate height appears to be unfavourable to the development of tuberculosis, though low rates are often found in low-lying localities and vice versa.

(4) Bad conditions of housing in towns, and certain industrial conditions even in rural districts, appear to favour the development and prevalence of pulmonary tuberculosis.

(5) The incidence among males and females is about 4 to 3.

Other Tubercular Disease.

The districts with the highest and lowest rates are:—

High.	Rate	Low.	Rate
Stow-on-the-Wold U. ...	0·82	Tewkesbury R. ...	0·18
Tewkesbury B. ...	0·78	Faringdon R.	0·17
Tetbury U.	0·53	Northleach R. ...	0·16
Cheltenham B. ...	0·46	Wheatenhurst R. ...	0·13
Cirencester U. ...	0·43	Newnham U.	0·09
Winchcombe R. ...	0·41	Nailsworth U. ...	0·07

A casual glance at the curves of death-rates shows that there is a tendency for this group to follow the general tenor of the curve for pulmonary tuberculosis, but there are such wide divergencies as to show that other influences are at work. The three urban districts heading this list are three of the four with the highest pulmonary rates, but for the second three one has to look much lower for the same names; on the other hand, while four of the six districts with low rates are very near the bottom of the pulmonary list, Wheatenhurst Rural District and Nailsworth Urban District, especially the former, are fairly high up. Looking at the grouping from the other point of view, the Stroud Urban and Rural Districts, which both have very high pulmonary rates, occupy low places in this group, particularly the rural district. From the map there appears to be little defined order of any kind, and contiguous areas vary in an extraordinary manner; a striking feature, however, in the map is the belt of very low death-rates running from Tetbury Rural District in the south to Newent and Tewkesbury in the north, while the districts west and east have comparatively high rates. It was hoped that a comparison of these rates with the incidence of tuberculosis in cattle would have afforded interesting information, but unfortunately with the outbreak of war the operation of the Tuberculosis Order of the Board of Agriculture and Fisheries was stopped before any conclusions could be drawn.

Turning to the parishes in the Stroud Union, again the general tendency appears to be to follow the curve for pulmonary tuberculosis, but also again there are wide divergencies. The parishes with the highest and lowest rates are, in order:—

HIGH.	Rate	LOW.	Rate
Randwick	0·69	Whiteshill	0·07
Horsley	0·56	Nailsworth	0·07
Cainscross	0·32	King's Stanley ...	0·05
Stroud	0·30	Thrupp	—
Leonard Stanley ...	0·30	Cranham	—
Rodborough	0·28	Pitchcombe	—

Five of the first group also had high pulmonary rates, but two of the second group were amongst the first eight parishes in the pulmonary list. The sex-incidence is nearer than for pulmonary tuberculosis, being about six males to five females; the order of the parishes for male and female rates separately approximates fairly closely to that for the total population. There is little if any difference between the main characteristics of the first four parishes in the low group and those in the high group.

The only conclusion suggested is that, while there is a general tendency for the rates for pulmonary and other forms of tuberculosis to follow one another, there are divergencies which require explanation. This may possibly be found, at least in part, when information as to the incidence of bovine tuberculosis is available.

Bronchitis.

The districts with the highest and lowest rates are, in order:—

HIGH.	Rate	LOW.	Rate
Coleford U.	1·75	Lydney R.	0·76
Tetbury U.	1·65	Campden R.	0·72
Faringdon R.... ...	1·62	Westbury U.	0·71
West Dean R. ...	1·49	Stow-on-the-Wold R. ...	0·53
Chipping Sodbury R. ...	1·35	Tewkesbury R. ...	0·50
Nailsworth U. ...	1·32	Newnham U.	0·45.

There would appear to be little in the general circumstances of the districts in the first group (except the mining industry in Coleford and West Dean) to suggest association, but the second group is purely agricultural, with the exception of Lydney, which contains quarries and large tinplate works. A glance at the map shows a curious band of high rates running from Cirencester to the north of the county, with another band of comparatively lower rate to the west of the former; the main physiographical difference between these two areas is that the former is largely on the plain of the Cotswolds, with a fairly general and gentle slope to the east, while the latter follows to some extent the escarpment of these hills. In the extreme south of the county is seen a similar contrast between Chipping Sodbury Rural District, to a considerable extent on the Cotswold Hills, and Warmley Rural District at their foot.

Turning now to the parishes, the groups are:—

HIGH.	Rate	LOW.	Rate
Leonard Stanley ...	2·26	Cranham	0·99
Painswick	1·61	Randwick	0·96
Woodchester	1·57	Rodborough	0·91
Pitchcombe	1·44	Thrupp	0·90
Nailsworth	1·32	Miserden	0·82
Horsley	1·32	Uplands	0·48

Here, again, there is little, if anything, in the general circumstances of the parishes to suggest explanation of the differences. Horsley, Nailsworth and Woodchester form a little group in the south in sheltered and somewhat confined combes and valleys, but Pitchcombe and Painswick stand fairly high in exposed positions, while Leonard Stanley lies low at the broad opening of the Stroud valley, slightly sheltered from southerly winds by rising ground behind. In the low group there appears to be little indication of any common set of conditions. The total male and female rates closely approximate, being 98 and 100 respectively, and, with exceptions, the above grouping holds fairly well for both sexes; the exceptions are that the high rates in Pitchcombe and Horsley are due to female mortality, and in Woodchester to deaths among males, and the low rates in Cranham and Rodborough principally to female, and in Miserden to male mortality.

The conclusion, if any may be drawn at all, is that exposure favours a low rather than a high rate, and sheltered position a high rather than a low rate.

Pneumonia.

In the general county figures lobar and lobular pneumonia are included in one group, but are separated in the statistics for the parishes in the Stroud Union. The districts with high and low rates respectively are, in order:—

HIGH.			LOW.		
	Rate	Females per 100 males		Rate	Females per 100 males
Kingswood U.	1·15	101	West Dean R.	0·51	91
Westbury U.	1·14	100	Awre U.	0·46	107
Coleford U.	1·09	104	Cirencester R.	0·45	103
Charlton Kings U.	0·99	134	Nailsworth U.	0·43	125
Thornbury R.	0·99	101	Campden R.	0·43	101
Warmley R.	0·99	106	Northleach R.	0·42	94

Though the first four districts are technically urban, the second is for all intents and purposes a large rural parish. If anything, however, the main difference between the two groups is an urban character for the former and an agricultural for the latter, marked exceptions in the first being the rural district of Thornbury and in the second the colliery district of West Dean Rural District and the industrial market town of Nailsworth.

Reference to the map shows a large expanse of low mortality lying between Cirencester in the south and the extreme limits of the county in the north, that is, an extensive area on the elevated plain sloping to the east. This is a striking contrast to the map for bronchitis, and led to a further analysis. Accordingly a chart was prepared on which the districts were arranged in descending order of bronchitis death-rate, and on it were traced the lines for bronchitis and pneumonia fatality. As was only to be anticipated, the latter is irregular, but the general tendency of the pneumonia line is in the opposite direction to that of the bronchitis line, indicating that the conditions favourable to the one complaint are unfavourable to the other and vice versa. This general conclusion is confirmed by comparing the two maps. The main exceptions are:—

Both high	Both medium	Both low
Coleford U.	Gloucester R.	Marston Sicca R.
Wheatenhurst R.	Tetbury R.	Campden R.
Charlton Kings U.	Dudley R.	
Kingswood U.	Cirencester U.	

The two districts with very low rates for both bronchitis and pneumonia, Campden and Marston Sicca Rural Districts, are two small contiguous rural areas, the latter entirely in the valley of the Avon and the former partly in the same valley and partly on the northern extremity of the Cotswold Hills. The circumstances of the other districts are so diverse that no general conclusion can be drawn, and I will pass on to consider whether or not the more detailed information available in the Stroud Union throws any light on the matter.

The first point brought out by those statistics is that, while the bronchitis rate is almost identical for the two sexes (1·15 for males and 1·17 for females), the male and female rates for pneumonia are very different, being 0·73 and 0·50 respectively—i.e., approximately three to two. The second is that this sex difference is less for lobular than for lobar pneumonia.

DEATH-RATES FOR PNEUMONIA, STROUD UNION.

	Male	Female	Total
Lobar	0·45	0·25	0·31
Lobular	0·28	0·25	0·31
Both forms	0·73	0·50	0·62

It would therefore appear that the main factor determining the total pneumonia rate is the male mortality from lobar pneumonia, or, in other words, while the sex constitution has little effect on the bronchitis rate, a large male proportion would raise the pneumonia rate. As regards the districts particularly mentioned above, the proportions of males to 100 females are those given, and it appears that some of the districts with proportions of males above the average yet have low pneumonia rates.

The third is that the curve for lobular pneumonia tends to follow that for bronchitis, while that for lobar pneumonia has a trend in the opposite direction. There are several marked exceptions in each case, but though less distinct than for the larger statistics for the districts, the same principle—low bronchitis, high pneumonia, or vice versa—seems to hold good. Thus, comparing the parochial male death-rates, the eight parishes with the highest mortality for bronchitis have the lowest rates for pneumonia with two marked exceptions, Painswick and King's Stanley: the former is third for both diseases and the latter sixth for bronchitis and second for lobar pueumonia. What the meaning of these exceptions is, I do not know; Painswick stands high and is exposed to the winds blowing up the branch valley running north-east, while King's Stanley stands partly near the bottom of and partly high up on the southern slope of the main valley facing north and is somewhat sheltered.

Cancer.

From the vastly greater incidence of cancer on females compared with males, the sex constitution of the population must of necessity be one of the most important factors in determining the relative death-rate; thus, comparing equal populations of females and males living under exactly the same conditions, the rates would be approximately 150 to 100. For strictly accurate comparison a further correction should be made for the age-constitution of the populations. Except for the parishes in the Stroud Union no correction has been made, and with respect to them only for sex and not for age. The records can therefore be taken as showing only the incidence among the populations as they exist, and for this reason it is practicable to draw no conclusions as to local effects. The map, however, shows a low mortality in the west of the county from Lydney right up to Tewkesbury, and an exceptionally low one in all four districts in the south-east; there seems to be little, if any, definite order. The incidence is greater in the urban districts than in the rural districts in the proportion of nearly 11 to 9. This is associated with an excess of females in urban districts compared with rural districts in the ratio of 6 to 5. The parishes in the Stroud Union similarly show no defined order, and there are wide variations between the male and female mortality in the same parish.

The above are the diseases and groups which have been worked up most completely, but information is also available as to the death-rates for the various districts for all the individual diseases and groups included in the Local Government Board tables for this period. The following are a few notes on some of them:—

Infectious Diseases.

There is no very great difference between urban and rural districts, though the balance is in favour of rural districts, owing to the smaller mortality from measles. The rates for other infections are nearly the same in both, except that those for influenza slightly, and diphtheria very slightly exceeded the rates in urban areas. The three diseases in this group causing the largest fatality are influenza, measles and whooping-cough, which between them make up two-thirds of the total death-rate. The districts of heaviest incidence were:—

District	Total rate	Typhoid fever	Measles	Scarlet fever	Whooping-cough	Diphtheria	Influenza	Erysipelas
Tewkesbury B.	1·17	0·06	0·28	0·04	0·13	0·43	0·21	0·02
Cirencester U.	1·08	0·09	0·15	0·01	0·21	0·15	0·40	0·07
Coleford U.	1·06	—	0·35	0·08	0·12	0·31	0·16	0·04
Kingswood U.	1·05	0·11	0·30	0·14	0·19	0·24	0·07	—
East Dean R.	1·04	0·02	0·21	0·07	0·18	0·26	0·29	0·01
Lydney R.	1·02	0·10	0·07	0·08	0·23	0·14	0·39	0·01
West Dean R.	1·00	—	0·25	0·06	0·23	0·22	0·22	0·02
Warmley R.	0·98	0·04	0·19	0·10	0·24	0·31	0·07	0·02
County	0·77	0·03	0·14	0·04	0·14	0·15	0·25	0·02

Tewkesbury owes its high position mainly to diphtheria and measles; Cirencester to influenza, whooping-cough and typhoid fever; Coleford to measles and diphtheria; Kingswood to diphtheria, scarlet fever, measles and typhoid fever; East Dean to diphtheria and measles; Lydney to influenza, whooping-cough and typhoid fever; West Dean to diphtheria, whooping-cough and measles; and Warmley to diphtheria and whooping-cough.

There are in the above districts two main groups, the Forest of Dean and the outskirts of Bristol, in both of which diphtheria is a very large factor, and in the former measles as well. These two groups have one characteristic in common in that they are both in coal-mining areas. The district outside the above groups with a strikingly high death-rate for one disease is Winchcombe Rural District, which has the second highest diphtheria rate for any district in the county.

Diarrhœa and Enteritis.

The urban rate is higher than the rural rate in the proportion of 0·40 to 0·26. The districts with the highest rates are:—

	Rate		Rate
Tewkesbury B.	0·65	West Dean R.	0·48
Kingswood U.	0·64	Warmley R.	0·46
Charlton Kings U.	0·63	Campden R.	0·45
Coleford U.	0·58	Cheltenham B.	0·40

Five of the above eight districts are amongst the eight with the highest infectious disease rates, especially for measles and diphtheria, and six of them have rates for infantile mortality considerably above the average for the county, indicating a lack of care in the management of children as the reason of the high mortality from all these causes.

Alcoholism and Cirrhosis.

The urban rate is nearly double that in the rural districts. Those districts with the highest rates are :—

	Rate		Rate
Stow-on-the-Wold U. ...	0·52	Stroud U.	0·19
Coleford U.	0·31	Awre U.	0·18
Tewkesbury B. ...	0·26	Dursley R.	0·18
Cheltenham B. ...	0·23	Wheatenhurst R. ...	0·18

Puerperal Conditions.

Rural districts are at a disadvantage compared with urban districts in the ratio of 10 to 7. The highest rates are :—

	Rate		Rate
Tetbury R.	0·19	West Dean R. ...	0·16
East Dean R.... ...	0·17	Cheltenham R. ...	0·14
Kingswood U.... ...	0·17	Coleford U.	0·12

Again the districts in the Forest of Dean appear, but in this group are associated with such purely rural areas as Cheltenham and Tetbury. That difficulty in securing medical assistance is not the sole factor appears to be shown by the occurrence of comparatively high rates for both puerperal fever and other puerperal conditions in such a district as Kingswood.

Violent Deaths.

The last distinct group to be considered is that for violent deaths in which, curiously enough, rural districts are also at a disadvantage, in the proportion of 5 to 4 :—

High.				Low.			
District	Total	Violent	Suicide	District	Total	Violent	Suicide
Awre U.	0·83	0·74	0·09	Stow-on-the-Wold U. ...	0·37	0·37	—
Gloucester R. ...	0.81	0·70	0·11	Tetbury U.	0·37	0·21	0·16
Wheatenhurst R. ...	0.81	0·71	0·10	Charlton Kings U. ...	0·36	0·22	0·14
Westbury-on-Severn ...	0·87	0·76	0·05	Coleford U.	0·35	0·31	0·04
Marston Sicca ...	0·78	0·65	0·13	Stow-on-the-Wold R. ...	0·35	0·21	0·14
Newnham U.... ...	0·72	0·63	0·09	Northleach R. ...	0·34	0·24	0·10
Lydney R.	0·70	0·62	0·08	Newent R.	0·30	0·21	0·09
Nailsworth U. ...	0·69	0·56	0·13	Tetbury R.	0·26	0·23	0·03
Thornbury R. ...	0·67	0·54	0·13	Kingswood U. ...	0·22	0·17	0·05

A very obvious feature in the above table is that the districts with high rates are, with the exception of Marston Sicca Rural District, those bordering the Severn west and east, and that each one of such districts, without exception, is included. As regards Marston Sicca Rural District, four of the five parishes are on the Rivers Avon and Stour. The only other districts with streams of any magnitude are Tewkesbury Borough and Rural District and Faringdon Rural District, and all three have high rates, though not so high as those already mentioned. It would therefore appear that so far as this county is concerned the decisive factor which determines the incidence of violent deaths is the opportunity for drowning. Including suicides, the districts remain in much the same order. If the districts are grouped in order of suicide-rate, ten of them are amongst the sixteen with the highest other violent death-rate, but there is no clear indication that opportunity for drowning is the deciding influence; indeed, there are only one—Thornbury Rural District—or two—with Tewkesbury Rural District—riverside districts among those with maximum suicide-rates. With the exception of Nailsworth Urban and Stroud Rural Districts, the high group of twelve districts includes only purely residential and agricultural districts.

The parochial rates do not give suggestion of any special order.

TOTAL DEATH-RATE.

The above account shows very clearly that an analysis of the total death-rate is a very complex matter, and that without such analysis, little, if any, conclusion can be drawn from comparison of total death-rates. The main result of adding the death-rates from different causes together is to produce a flattening of the curve of death-rates, as is clearly seen both in the various charts and in the map of total death-rates. Charts have been prepared to show more clearly the proportions of deaths from defined causes.

INQUIRY AS TO DEATH-RATES IN STROUD UNION, 1891-1901.

It now remains to see whether or not it is possible to make any general statement as a result of the above analysis, but before attempting this I would briefly refer to a somewhat similar investigation which I made more particularly with reference to the parishes in the Stroud

Union for the ten years 1891-1901; this inquiry[1] was conducted on somewhat different lines, in that each death was "spotted" on a map; the various deaths, in addition to being grouped in parishes, were classified for each disease according to elevation and geological substructure. The diseases selected for this investigation were cancer, other malignant diseases, pulmonary tuberculosis, other forms of tuberculosis, lobar pneumonia and lobular pneumonia, and the following conclusions were tentatively drawn as a result of the analysis:—

(1) Cancer is more prevalent on impervious than on porous soils, but does not appear to be influenced by elevation.

(2) Other malignant diseases appear to support the above in that the general tendency is in the same direction.

(3) Phthisis is more prevalent on impervious soils than on porous soils, and at low (below 150 ft. O.D.) and comparatively high (350 to 500 ft. O.D.) elevations than on porous structures and at moderate elevations (150 to 350 ft. O.D.). High elevations appear to favour the development of phthisis.

(4) Other tubercular diseases do not appear to be so directly influenced by elevation, though they are mostly prevalent at elevations below 100 ft. O.D. on an impervious subsoil.

(5) Pneumonia, both lobar and lobular, seems to be affected in the opposite direction to phthisis by both subsoil and elevation.

COMPARISON OF AREAS AS TO SUBSOIL AND ELEVATION.

It may be said at once that the present inquiry was not conducted on lines which render close comparison with the former investigation practicable, in that in the area of any parish the conditions may vary greatly in different parts as regards subsoil and elevation, and infinitely more so in the larger areas of districts. There are indeed few parishes and fewer districts in which these conditions can be regarded as more than comparatively uniform, and the factors acting in one direction, owing to the main conditions, may be counterbalanced in considerable degree by others acting in the opposite direction.

The parishes in the Stroud Union mainly on a clay subsoil are Leonard Stanley, Cainscross, and Stonehouse, all at a low elevation; the proportionate death-rates are:—

---

[1] "An Inquiry into the Distribution of Certain Diseases on the Cotswold Hills," *Public Health*, October, 1904.

District	Sex	Pulmonary tuberculosis	Other tuber-cular con-ditions	Cancer	Pneumonia		Bronchitis	Total
					Lobar	Lobular		
Leonard Stanley...	M.	206·0	167	—	—	—	209	114
	F.	68·0	124	146·0	—	—	180	94
	Both	129·0	143	97·0	—	—	193	102
Cainscross ...	M.	77·0	95	99·0	24	—	136	90
	F.	81·0	205	108·0	41	84	80	105
	Both	79·0	152	106·5	34	45	106	98
Stonehouse ...	M.	128·0	95	88·0	73	32	85	94
	F.	49·0	114	45·0	78	52	111	90
	Both	84·5	105	62·0	76	42	99	102

And for those on a porous subsoil in a more or less elevated position :—

District	Sex	Pulmonary tuberculosis	Other tuber-cular con-ditions	Cancer	Pneumonia		Bronchitis	Total
					Lobar	Lobular		
Painswick ...	M.	108	129	59	173	29	152	115
	F.	58	33	114	49	152	124	90
	Both	79	71	99	102	100	138	103
Bisley	M.	53	95	111	49	65	69	92
	F.	110	95	85	24	32	101	106
	Both	82	95	97	37	48	85	99
Minchinhampton	M.	97	114	132	129	152	86	100
	F.	72	71	112	61	126	97	92
	Both	84	86	122	93	139	92	96
Miserden ...	M.	—	267	—	273	—	48	62
	F.	46	—	126	—	—	91	71
	Both	23	129	76	134	—	70	67

Death-rates for districts at comparatively low elevations and a more or less impervious substructure :—

In order of uncorrected total death-rate	Pulmonary tuberculosis	Other tubercular conditions	Pneumonia	Bronchitis	Cancer	Total (corrected)
Tewkesbury B. ...	148	252	97	92	119	128
Wheatenhurst R. ..	109	42	114	119	117	103
Cheltenham B. ...	100	148	119	80	129	108
Marston Sicca R. ...	98	84	66	78	155	102
Charlton Kings U. ...	129	100	125	116	121	101
Westbury-on-Severn U.	133	123	144	66	119	100
Thornbury R. ...	105	116	125	85	108	95
Chipping Sodbury R. ...	76	81	101	123	74	91
Faringdon R. ...	59	55	97	150	71	89
Gloucester R. ...	78	74	80	99	95	88
Pebworth R.	49	103	66	95	95	83
Tewkesbury R. ...	77	58	101	46	90	78

The same for districts at more or less elevated positions with, on the whole, porous substructure:—

In order of uncorrected total death-rate	Pulmonary tuberculosis	Other tubercular conditions	Pneumonia	Bronchitis	Cancer	Total (corrected)
Tetbury U.	186	171	75	153	83	117·0
Stow-on-the-Wold U. ...	156	264	113	110	124	115·0
Northleach R. ...	83	52	53	120	85	96·5
Cirencester U. ...	112	139	95	92	124	105·0
Cirencester R. ...	79	84	57	119	127	95·0
Tetbury R.	55	68	86	96	71	72·0

It will be seen from the above statement that—

(1) Cancer may be just as common in parishes and districts with a porous substructure as in those on a more or less generally impervious subsoil.

(2) Phthisis may be prevalent in areas at high elevations on porous substructures.

(3) Other tubercular rates vary similarly.

(4) Pneumonia in the parishes tends to be more common in the group at high elevations on pervious substructures and in the opposite group for the districts, the former confirming the earlier inquiry and the latter controverting it.

GENERAL CONCLUSIONS.

It has, I think, been clearly demonstrated that it is a very difficult matter to trace cause and effect in an analysis of the death-rates from various causes in areas which necessarily contain diverse conditions, and the question remains whether or not it is possible to draw any conclusions. This can be done to a certain extent, and I would venture to suggest that the following statements are probably justified by the foregoing analysis:—

(1) *General Death-rate.*—(*a*) It cannot be said that low elevations, even with an impervious subsoil, are necessarily productive of high death-rates or that converse conditions result; (*b*) owing to the higher death-rate among males (9) than among females (8) the total death-rate is mainly influenced by the male death-rate.

(2) *Pulmonary Tuberculosis.*—(*a*) From the fact that the curve of death-rates from all causes less tuberculosis follows the same general tendency as the curve for that disease, the conditions favouring a high

general death-rate would appear to be in the main the same as those favouring a high tuberculosis rate; (*b*) the death-rate in agricultural districts tends to be low; (*c*) within certain limits moderate elevations appear to be unfavourable to the development of pulmonary tuberculosis, though low rates are also found in low-lying localities and vice versa; (*d*) towns in situations which would appear to be favourable to a low death-rate have a high rate, and this fact is associated with bad housing conditions; (*e*) certain industrial rural districts have more or less high rates; (*f*) the ratio of the male death-rate to the female death-rate is about 4 to 3.

(3) *Other Tubercular Diseases.*—(*a*) There is a general tendency for the curves and rates for pulmonary and other forms of tuberculosis to follow one another, but there are divergencies which require explanation. This may possibly be found, at least in part, when information as to the local incidence of bovine tuberculosis is available; (*b*) the ratio of the male to the female death-rate is about 6 to 5.

(4) *Bronchitis.*—(*a*) Exposure appears to favour a low rather than a high death-rate, and sheltered positions a high rather than a low death-rate; (*b*) the rate in rural districts is slightly higher than that in urban districts; (*c*) the male and female death-rates closely approximate.

(5) *Pneumonia.*—(i) All forms: (*a*) The curves and rates and the general areas affected tend to be the converse to those for bronchitis; (*b*) the rate in urban districts is higher than that in rural districts. (ii) Lobular pneumonia: (*a*) The curve for lobular pneumonia tends to follow that for bronchitis; (*b*) the incidence of lobular pneumonia on the two sexes is about the same as for bronchitis. (iii) Lobar pneumonia: (*a*) The curves and rates have a trend in the opposite direction to those for bronchitis; (*b*) the ratio of the male to the female mortality is approximately 3 to 2.

(6) *Cancer.*—(*a*) The present inquiry enables no conclusion to be drawn, but the investigation made for the Stroud Union in the decennium 1891-1901 seemed to indicate an increased incidence on impervious soils; (*b*) the ratio of the male to the female mortality is about 2 to 3.

(7) *Infectious Diseases.*—(*a*) Influenza, diphtheria, measles and whooping-cough cause the highest mortalities; (*b*) influenza is more an illness of rural than urban districts; (*c*) the diphtheria death-rate is very slightly higher in rural than in urban districts, but the average case fatality is very slightly lower in rural than in urban districts; (*d*) the whooping-cough death-rate is approximately the same in rural

and in urban districts; (*e*) for measles, on the other hand, the mortality is twice as great in urban as in rural districts; (*f*) the areas in which the rates for diphtheria and measles are highest are the colliery districts in the Forest of Dean and in the neighbourhood of Bristol.

(8) *Diarrhœa and Enteritis.*—The apparent association of high rates for these conditions with high rates for measles, and in some cases diphtheria and whooping-cough, and also with high infantile mortality, indicates that the main factor in connection with all these groups is lack of care in the management of children.

(9) *Puerperal Conditions.*—The mining area of the Forest of Dean has the highest rate for puerperal conditions, but with it are associated agricultural areas in which difficulty in securing medical assistance is a factor.

(10) *Violent Deaths.*—The decisive factor in Gloucestershire appears to be opportunity for drowning, but there is indication that this does not influence the suicide-rate. As regards the latter, the rate seems to be highest in purely residential and agricultural districts.

As a general result, the personal impression left on my mind is that while "locus" may, and probably does, influence the death-rate from certain conditions, a still more important factor appears to be the circumstances of the home—i.e., immediate as opposed to more remote environment.

DISCUSSION.

(*Continued on p.* 32.)

Dr. S. D. CLIPPINGDALE: I have listened to Dr. Martin's paper with great pleasure. Dr. Martin has given the vital statistics of a district with a chalk subsoil, and I have myself described a similar district in a paper read before another Section.[1] In the Chiltern Hills I found that the remedy used to soften the water, while it reduced the number of cases of stone, seemed to have increased the number of cases of goitre. Cancer I have found very prevalent in some of the Chiltern valleys, and it is apparently of a tribal or family character. Consumption is uncommon unless it is imported, and it has been found that if a patient (say a man) suffering from tuberculosis come into the district and marry a native woman, the wife will acquire her husband's malady in a most acute and rapidly fatal form, illustrating the well-established fact that a new disease always attacks new soil with especial virulence.

---

[1] *Proc. Roy. Soc. Med.* 1910, iii (Baln. Sect.), pp. 29-48.

TABLE I.—GLOUCESTERSHIRE DISTRICTS :

	Elevation, feet O.D.	Subsoil	Average population 1901-1910	Females per 100 males (1911)	Occupations	Housing, 1911		Birth-rate
						Percentage of over-crowding	Average number per house	
Urban :—								
Awre	25-350	Old Red Sandstone, Keuper Marl, Lower Lias	1,083	2	Agricultural, mining, fishing	2	1	2
Charlton Kings	275-400	Lower Lias	4,151	3	Residential, dairying	1	2	3
Cheltenham ...	100-200	Lower Lias (and Sands)	49,192	4	Residential and educational	1	4	2
Cirencester ...	340-420	Great Oolite	7,584	3	Residential market town	3	4	2
Coleford ...	600-700	Coal Measures	2,574	2	Coal- and iron-mining, stone quarrying and agriculture	4	3	3
Kingswood ...	50-400	Coal Measures	12,333	2	Boots, stays, motor bicycle, and coal-mining	3	4	3
Nailsworth ...	150-550	Upper Lias, Great Oolite	3,030	3	Market town, various factories	1	1	2
Newnham ...	20-200	Keuper Marl	1,103	3	Agricultural and residential	1	1	2
Stow-on-the-Wold	700-750	Great Oolite	1,344	2	Agriculture	1	1	2
Stroud ...	125-500	Middle Lias, Inferior Oolite	8,963	3	Cloth manufacture and ready-made clothing, breweries, &c.	2	3	2
Tetbury ...	350-400	Great Oolite	1,874	2	Market town, brewery	2	1	3
Tewkesbury ...	35-150	Keuper Marl, Lower Lias, Alluvium	5,353	3	Flour mill, sweet factories, builders, agriculture	4	3	3
Westbury ...	20-125	Keuper Marl, Lower Lias	1,839	2	Agriculture	2	4	3
Rural :—								
Campden ...	150-550	Lower Lias, Inferior Oolite	5,519	2	Agriculture	4	2	3
Cheltenham ...	140-980	Lower Lias, Inferior Oolite	4,946	3	Agriculture, residential	1	2	2
Chipping Sodbury	150-600	Coal Measures and Lower Lias	21,529	2	Agriculture, tailoring (home work), coal-mining	3	3	2
Cirencester ...	250-500	Forest Marble, Great Oolite, and Oxford Clay	12,416	2	Agriculture	4	2	2
Dursley ...	25-750	Lower Lias, Great Oolite	11,935	3	Agriculture, various factories	2	2	2
East Dean ...	30-750	Coal Measures, New and Old Red Sandstone	19,982	2	Coal-mining, stone quarrying, agriculture	4	3	4
Faringdon ...	230-300	Oxford Clay	1,173	2	Agriculture	1	2	3
Gloucester ...	20-200	Lower Lias and Alluvium	11,697		Agriculture	1	4	2
Lydney ...	25-780	Old Red Sandstone, carboniferous limestone, Keuper Marl, Alluvium	8,827	3	Agriculture, stone quarrying, tinplate works	3	4	3
Marston Sicca	150-200	Lower Lias, Keuper Marl, Alluvium	1,547	2	Agriculture	4	2	2
Newent ...	50-550	New & Old Red Sandstone	7,016	2	Agriculture	2	2	3
Northleach ...	260-750	Inferior Great Oolite	8,078	2	Agriculture	3	1	2
Pebworth ...	150-550	Lower Lias	3,092	2	Market gardening and farming, glove (home work)	3	3	3
Stow-on-the-Wold	350-700	Lower Lias, Great Oolite	6,638	2	Agriculture, stone slate quarrying at Byford	3	2	2
Stroud ...	75-860	Lower Lias, Great Oolite	27,931	2	Cloth and various mills, agriculture	2	1	2
Tetbury ...	300-750	Inferior Great Oolite	3,857	3	Agriculture	4	3	2
Tewkesbury ...	30-150	Keuper Marl, Lower Lias, Alluvium	5,030	2	Agriculture	3	2	2
Thornbury ...	25-250	Alluvium, New and Old Red Sandstone, carboniferous limestone, and varied volcanic rocks	18,781	2	Agriculture, stone quarries (Tytherington), docks at Sharpness	2	3	2
Warmley ...	50-230	Upper Coal Measures	16,570	2	Agriculture, shoe-making, and various factories	2	4	3
West Dean ...	250-650	Coal Measures, carboniferous limestone, Old Red Sandstone	13,040	2	Coal-mining, agriculture	4	4	4
Wheatenhurst	25-200	Lower Lias, Inferior Oolite	6,099	2	Factory and river work, agriculture, leather board and malt	2	1	2
Winchcombe	100-800	Lower Lias, Great Oolite	9,120	2	Agriculture, paper and leather factories	3	2	3
Total Urban ...	—	—	100,423	3	—	1	3	2
,, Rural ...	—	—	224,823	2	—	3	3	3
County	—	—	325,246	111	—	5·0	4·36	22·69

Death-rate for County = 100 : rates over 125 = 4 ; 101-125 = 3 ; 76-100 = 2 ; 75 and under = 1.

DEATH-RATES, &c., 1901-1910.

Infantile mortality	Typhoid fever	Measles	Scarlet fever	Whooping-cough	Diphtheria	Influenza	Erysipelas	Total infections	Pulmonary tuberculosis	Other tubercular conditions	Cancer	Bronchitis	Pneumonia	Other respiratory conditions	Enteritis, &c.	Alcoholism	Puerperal	Premature	Violent	Suicide	Not defined	Total
2	—	1	4 (*4*)	4	1 (*4*)	—	—	1	3	2	1	3	1	1	—	4	—	1	4	2	3	3
4	4	4	—	4	1 (*1*)	1	—	2	4	2	3	3	3	2	4	—	—	4	1	4	2	3
3	3	4	1 (*1*)	2	1 (*2*)	2	2	2	2	4	4	2	3	3	4	4	1	2	1	2	3	3
2	4	3	1 (*1*)	4	2 (*4*)	4	4	4	3	4	3	2	2	3	2	2	1	1	2	1	2	3
3	—	4	4 (*4*)	2	4 (*4*)	1	4	4	3	1	2	4	4	4	4	4	4	4	2	1	2	3
4	4	4	4 (*4*)	4	4 (*4*)	1	—	4	3	3	1	3	4	2	4	1	4	4	1	1	2	2
2	—	2	—	1	1 (*1*)	2	3	1	2	1	4	3	1	1	1	4	3	1	4	3	3	3
3	4	1	—	4	1 (*4*)	1	—	3	1	1	2	1	3	4	1	1	—	2	4	2	3	3
3	4	1	—	—	—	—	4	1	4	4	3	3	3	—	—	4	—	4	2	—	3	3
3	3	2	1 (*1*)	3	1 (*3*)	2	3	2	4	2	3	3	3	1	2	4	3	2	2	3	2	3
3	4	4	—	4	—	1	4	3	4	4	2	4	1	1	3	3	3	3	1	4	4	4
3	4	4	2 (*1*)	2	4 (*4*)	2	2	4	4	4	3	2	2	3	4	4	1	3	4	3	4	4
1	—	1	—	2	4 (*4*)	2	—	2	4	3	3	1	4	—	—	2	3	3	4	1	4	3
1	4	2	—	2	1 (*3*)	4	2	3	2	2	3	1	1	1	4	2	1	2	3	1	3	3
2	—	1	2 (*2*)	1	1 (*2*)	3	4	2	1	2	2	3	2	4	1	3	4	2	3	4	2	2
2	1	1	4 (*4*)	2	1 (*4*)	1	1	1	2	2	1	3	3	1	1	1	3	2	2	1	2	2
2	—	1	1 (*1*)	3	1 (*1*)	4	—	2	2	2	4	3	1	1	2	1	1	2	2	3	3	2
2	1	1	1 (*1*)	2	1 (*3*)	2	4	2	2	1	2	2	2	4	1	4	2	1	2	1	3	3
3	1	4	4 (*4*)	3	4 (*2*)	3	1	4	2	3	2	3	3	4	3	1	4	3	3	1	3	3
2	—	1	4 (*4*)	1	4 (*4*)	3	—	3	1	1	1	4	2	—	1	—	—	3	3	4	2	2
2	3	1	1 (*1*)	1	2 (*3*)	1	2	1	2	1	2	2	2	3	2	1	1	2	4	3	2	2
2	4	1	4 (*4*)	4	2 (*1*)	4	1	4	2	1	2	1	3	3	2	1	3	2	4	2	3	3
4	—	2	—	4	—	3	4	2	2	2	4	2	1	1	3	—	1	1	4	3	4	3
2	2	1	—	2	4 (*4*)	4	4	3	1	1	2	2	3	4	2	3	1	2	1	2	3	2
2	1	1	2 (*1*)	3	1 (*4*)	3	2	2	2	1	2	3	1	4	1	1	1	2	1	2	4	3
1	—	4	1 (*2*)	3	4 (*3*)	1	3	3	1	3	2	2	1	3	1	3	2	3	2	3	2	2
2	2	1	1 (*1*)	4	1 (*4*)	4	2	2	2	2	3	1	3	4	1	1	1	2	1	4	3	2
2	1	1	1 (*2*)	1	1 (*2*)	4	3	2	4	1	3	3	1	1	1	3	3	1	3	3	2	2
2	—	1	—	1	1 (*4*)	1	—	1	1	1	1	2	2	1	1	1	4	1	1	1	1	1
1	1	1	2 (*2*)	1	1 (*4*)	2	2	1	2	1	2	1	3	1	2	1	3	1	3	4	2	2
2	2	1	3 (*4*)	1	1 (*1*)	3	1	2	3	3	3	2	3	1	1	1	1	2	4	3	2	2
3	3	4	4 (*4*)	4	4 (*4*)	1	2	4	3	2	1	3	3	1	4	2	2	4	2	2	2	2
3	—	4	4 (*2*)	4	4 (*3*)	2	2	4	2	2	2	4	1	4	4	2	4	4	4	1	2	2
2	1	4	1 (*2*)	1	1 (*4*)	4	2	3	3	1	3	3	3	2	1	4	2	2	4	2	3	3
2	—	1	2 (*2*)	1	4 (*4*)	—	3	1	3	4	3	3	1	2	2	1	4	1	3	2	3	3
3	4	4	1	3	2	2	3	3	3	4	3	2	3	2	4	4	1	3	2	2	3	3
2	1	1	2	2	2	3	2	2	2.	2	2	3	2	2	2	1	3	2	3	2	2	2
89·5	0·03	0·14	0·04	0·14	0·15	0·25	0·02	0·77	0·86	0·31	0·96	1·08	0·79	0·12	0 30	0·13	0·09	0·40	0·39	0·10	7·24	13·5 3

The italic figures in parentheses denote fatality-rates per 100 cases.

TABLE II.—PARISHES IN STROUD UNION.

	Elevation, feet O.D. (majority of inhabitants)	Subsoil	Average population 1901-1910	Females per 100 males (1911)	Occupations	Housing (1911)		Birth-rate	Infantile mortality
						Percentage of over-crowding	Average number per house		
Bisley	600+	Fuller's earth, 40 per cent.; Great Oolite, 37 per cent.	2003·5	2	Agriculture, general	—	2	2	3
Cainscross ...	100-250	Lower Lias, 74 per cent.	2177·0	2	Textile, agriculture	—	2	2	1
Chalford ...	550-650	Great Oolite, 40 per cent.; Fuller's earth, 32 per cent.	2946·5	2	Furniture, food	—	2	3	2
Cranham ...	600+	Upper Lias, 57 per cent.; Inferior Oolite, 43 per cent.	303·5	2	Agriculture	—	2	1	4
Horsley ...	350-550	Inferior Oolite, 43 per cent.	1061·5	2	Agricultural, general, domestic	—	3	4	2
King's Stanley...	150-200 350-400	Lower Lias, 48 per cent.; Lias Sands, 39 per cent.	1861·0	2	Textile	—	2	2	2
Leonard Stanley	100-200	Lower Lias, 100 per cent.	664·5	3	Textile, agriculture	—	2	2	3
Minchinhampton	500-650	Fuller's earth, 40 per cent.; Great Oolite, 30 per cent.	3719·5	2	Domestic, agriculture	—	2	2	2
Miserden ...	650+	Great Oolite, 69 per cent.	366·0	2	Agriculture	—	2	3	1
Nailsworth ...	200-400	Lias Sands, 45 per cent.	3029·5	3	Food, textile	—	2	3	2
Painswick ...	400-550	Lias Sands, 78 per cent.	2612·5	3	General, agriculture, domestic, pin-workers	—	3	2	2
Pitchcombe ...	350-450	Lias Sands, 100 per cent.	208·0	2	Agriculture	—	2	1	2
Randwick ...	450-550	Lias Sands, 68 per cent.	726·5	3	Textile, dress	—	2	3	4
Rodborough ...	150-400	Lias Sands, 64 per cent.	3549·5	2	General, textile	—	2	3	2
Stonehouse ...	100-150	Lower Lias, 99 per cent.	2243·5	3	Agriculture, general	—	3	2	3
Stroud ...	150-400	Lias Sands, 42 per cent.	7557·5	3	Dress	—	3	3	4
Thrupp ...	150-300	Lias Sands, 75 per cent.	1327·5	3	Metals, construction, dress	—	2	2	1
Uplands ...	150-300	Upper Lias, 74 per cent.	1402·5	2	Domestic	—	3	3	3
Whiteshill ...	450-550	Lias Sands, 34 per cent.; Inferior Oolite, 34 per cent.	1334·5	2	Textile, construction	—	3	3	3
Woodchester ...	250-300	Lias Sands, 82 per cent.	825·5	3	Textile, pin-workers	—	2	2	3
Union	—	—	39,920	—	—	—	4·05	19·64	82·4

Average for Union = 100: Rates over 125 = 4;

DEATH-RATES, &c., 1901-1910.

Typhoid fever	Measles	Scarlet fever	Whooping-cough	Diphtheria	Influenza	Erysipelas	Total infections	Pulmonary tuberculosis	Other tubercular conditions	Cancer	Bronchitis	Pneumonia	Other respiratory conditions	Enteritis, &c.	Alcoholism	Puerperal	Premature	Violent	Suicide	Not defined	Total
—	—	—	4	1	4	4	3	2	2	2	2	1	—	4	1	4	3	2	—	3	3
4	1	4	1	1	3	—	2	2	4	3	3	1	4	1	4	—	1	3	2	3	2
—	1	4	2	4	1	3	2	2	1	3	3	3	2	1	3	3	3	2	2	3	3
—	—	—	—	—	2	—	1	2	—	3	2	1	—	4	—	—	4	4	—	3	2
—	4	—	—	4	1	—	2	4	4	3	3	2	—	2	3	4	3	4	4	3	4
—	—	4	3	4	4	—	3	2	1	3	3	4	—	4	4	4	3	1	4	3	3
—	4	—	4	—	4	—	4	4	4	2	4	—	—	2	2	4	1	4	4	2	3
4	—	4	2	1	4	—	3	2	2	3	2	4	4	2	1	—	1	2	1	2	2
—	—	—	—	—	4	—	1	1	3	1	1	2	—	—	4	4	—	1	—	1	1
—	4	—	1	1	1	3	1	1	1	3	3	1	2	1	3	3	3	4	3	3	3
—	2	—	1	—	4	4	3	2	1	2	4	3	4	3	1	4	2	2	4	3	3
—	—	—	—	—	4	—	1	1	—	2	3	2	—	—	—	—	1	4	4	3	2
4	—	—	—	4	2	—	1	4	4	2	2	4	—	4	—	4	2	1	3	2	3
—	4	4	4	4	3	3	3	3	4	2	2	2	4	3	1	1	1	4	4	2	2
4	4	—	3	3	3	4	4	2	3	1	3	1	3	3	4	2	1	2	4	2	2
4	4	—	4	2	2	4	2	4	4	2	3	4	3	4	3	1	3	3	3	3	3
—	—	—	—	—	1	—	1	3	—	2	2	1	—	2	—	4	1	4	—	3	2
—	2	—	4	—	1	—	1	2	2	3	1	3	—	—	2	4	4	1	—	1	2
—	2	4	4	4	1	—	3	3	1	2	3	4	—	1	2	4	3	1	1	2	2
—	—	—	—	4	1	4	2	3	1	4	4	2	4	3	4	4	2	4	3	2	3
0·02	0·09	0·01	0·11	0·08	0·37	0·03	0·71	1·18	0·22	1·10	1·16	0·60	0·04	0·20	0·17	0·09	0·77	0·41	0·12	6·47	13·44

101-125 = 3 ; 76-100 = 2 ; 75 and under = 1.

Colonel J. LANE NOTTER: In this very interesting paper by Dr. Middleton Martin there is one sentence which, in relation to phthisis, is especially significant. He states: "High elevations appear to favour the development of phthisis." This bears out our experience in India. Cases of well-marked phthisis are decidedly rendered worse by being transferred for a change from the plains to a hill climate. There are certain elements present which detract from the advantages of hill climates. These are the rarefied air affording a less supply of oxygen, the heat, and, in India, the direct rays of an intra-tropical sun, and the absence, too, of well-marked seasons. Humidity is also a most important factor.

Sir SHIRLEY MURPHY: I note that Dr. Martin has recognized the necessity of having regard for differences in the age- and sex-distribution, and in the social condition of the populations concerned. I hope that at some future date Dr. Martin will be able to show corrections for sex and age as far as possible in his rates. Correction for age is especially needed for such diseases as cancer, the mortality of which has a special age-incidence.

Dr. MARTIN (in reply): I fully recognize the limitations of my paper, and the fact that my conclusions apply only to the circumstances of Gloucestershire and the population as it existed in the period under review. The comparisons of the incidence of diseases, however, relate to exactly the same populations, and for this reason I am inclined to the view that the observed contrast of the distribution of certain conditions, particularly bronchitis and pneumonia, has considerable significance. The experience of Colonel Lane Notter as to high elevations in India favouring development of tuberculosis, especially among soldiers going to the hills, is very interesting: in this country and on the Continent, where I believe similar observations have been made, one explanation which has been offered is that at high elevations the home environment is actually worse than at lower elevations, from the fact that owing to winds being felt more strongly the houses are kept more tightly closed at high elevations. I have been greatly interested in Dr. Wheatley's report on tuberculosis among stone-workers, but so far as I am aware there is no special incidence of the disease in Gloucestershire from this cause. In conclusion, I hope that it may be possible for me at the end of the present decennium to compare the results for the two periods, taking advantage of the criticism and encouragement I have now received.

Section of Epidemiology and State Medicine.

President—Dr. C. J. MARTIN, F.R.S.

Studies on Egyptian Sand Amœbæ.

(Communicated, and taken as read.)

By Lieut.-Colonel Sir RONALD ROSS, K.C.B., F.R.S., R.A.M.C.(T.F.),

and Captain DAVID THOMSON, R.A.M.C.(T.), M.B.

(I) THE EXAMINATION OF FÆCAL DEPOSITS ON SAND.

IN July, 1915, the authors commenced an investigation on amœbic dysentery with a view to obtaining more definite information as to how the disease is transmitted from man to man. Laboratory accommodation was kindly given by Lieut.-Colonel Robinson, P.M.O. at No. — General Hospital, Alexandria. We commenced our research by depositing portions of dysenteric stools, containing blood, mucus, and pathogenic amœbæ, on the ordinary dry, sun-baked sand obtained outside our laboratory. The sand was contained in shallow tin vessels; the excess of moisture or urine in the stool drained away into the sand, and a slimy deposit remained on the surface. In this way it was intended to imitate exactly on a small scale what occurs naturally when no latrines are available. The slimy or semi-moist deposit was then examined microscopically day by day, both by wet film and by staining methods. After one or two days it was found that the original pathogenic amœbæ or cysts had apparently disappeared, or only degenerate traces of them could be found. It appeared to us that the vegetative forms of the amœbæ died and disintegrated rapidly, more especially when much fluid such as urine was present in the stool. In such a urinated stool, a few hours old, motile amœbæ were seldom found.

They appeared to become swollen, spherical, and motionless. This excess of urine seemed also to be harmful to the cysts, since they also disappeared from such a specimen in twenty-four to forty-eight hours.

(II) THE DISCOVERY OF PROTOZOA IN THE SAND.

With regard to the miniature deposits of fæces on sand, we generally found no trace of the original pathogenic amœbæ after two days, but usually on the third day we found swarms of actively moving amœbæ of a new type, though occasionally these did not appear until the fourth or fifth day. This new amœba corresponded with the type known as *Amœba limax* (*vide* figs. 2 to 8, and fig. 11). The question at once arose as to whether it developed from the dysenteric fæces or from the sand on which these fæces were deposited. Besides the amœbæ of *limax* type, there also appeared as a rule in the deposit an infusorian somewhat like a balantidium, and also small mono- and bi-flagellates. It was eventually proved conclusively that all of these came from the sand, and this seemed to us all the more remarkable in that the sand used in our experiments was very dry surface sand, exposed all day long to the glare of the Egyptian summer sun. That these organisms came from this sand was proved in the following manner:—

(*a*) No such protozoa developed on fæces deposited on sand which had previously been sterilized by roasting.

(*b*) When sterile bouillon was poured on the unsterilized sand so as to moisten it into a paste, all three organisms developed in two or three days (figs. 1, 15, 16, and 17).

(*c*) Condensed milk poured on the sand developed a few active amœbæ after some days.

(*d*) When the sand was sprinkled on a sterile agar plate or on a slope agar, active amœbæ of *limax* type were found growing profusely as a rule on the third day, and extending outwards from the islets of sand (*vide* figs. 9, 10, 12, and 13). The infusorian (fig. 14) and the flagellates occasionally appeared if the agar was very moist on the surface, but the amœbæ always predominated in numbers.

In addition, the agar and bouillon cultures of the sand developed numerous species of moulds, cocci and bacilli; sporing bacilli with central and terminal spores and often motile were particularly common. The protozoa ingested the cocci and bacilli in large numbers, and doubtless derived their sustenance from them more than from the agar or bouillon.

(III) THE PROBLEMS PRESENTED BY THE PRESENCE OF THESE PROTOZOA.

It is generally stated that the direct rays of the sun have a powerful sterilizing effect, being harmful to germs; so that it is all the more remarkable that the dry surface sand in Egypt should, in spite of the continuous exposure to bright sunshine, contain in latent form not only numerous species of bacteria but also numerous protozoal organisms. The following problems with regard to the latter naturally presented themselves:—

(*a*) Did the protozoa live an active life and multiply in the sand, or did they only exist as spores or cysts?

(*b*) Did they exist in the sand to a considerable depth?

(*c*) Were they present in the sand all over Egypt as well as in the sand near our laboratory?

(*d*) If passive when the sand was dry, did they become active and multiply in the moist sand after rain or heavy dew?

(*e*) Were they natural, free-living organisms in the sand or did they get there only from the fæces of man and animals?

(*f*) How long could their cysts or spores live in the passive state?

(IV) THE PROTOZOA EXIST IN THE DRY SAND IN THE FORM OF CYSTS OR SPORES.

It is self-evident that in dry, powdery sand at least, organisms such as amœbæ, flagellates and infusoria must be living a passive existence, most likely as cysts or spores. The dry sand when shaken up with water and examined under a cover-slip microscopically was found to contain definite spores and cysts of various sizes, but often these were much shrivelled, with a rough outline, and it was rather difficult sometimes to distinguish them from the grains of sand themselves. No actively moving forms were observed.

(V) THE DEPTH AT WHICH THESE PROTOZOA CEASE TO BE FOUND.

On three occasions we took samples of sand at a depth of 4 ft., but failed to find any trace of protozoa by culture methods, though bacteria and moulds grew in abundance. Specimens taken at a depth of 1 ft., however, showed very abundant amœbæ and flagellates in culture; the latter seemed especially abundant. Crumbling sandstone from the catacombs did not develop any protozoa, but a sample taken from one of the graves containing bones developed numerous amœbæ in culture. Of course, it is probable that sand from the surface had got into these graves.

(VI) THE PRESENCE OF THESE PROTOZOA IN THE EGYPTIAN SAND IS NOT PURELY LOCAL BUT WIDESPREAD.

Samples of sand were taken from various localities in and around Alexandria. From all of these except one, amœbæ and other protozoa were obtained by cultivation, by moistening the sand with bouillon, or by depositing the sand-grains on agar plates or slopes. It was noticed that the growths appeared more quickly and were more profuse when the sample of sand was taken from a contaminated locality. For example, sand taken near a dung-heap at a farm eight miles out of Alexandria developed in culture swarms of *Amœba limax* flagellates and infusoria on the third day, also large numbers of bacilli with terminal spores. Another sample from the roadside a few miles from Aboukir showed swarms of these organisms in culture on the third day, this sample being heavily contaminated with dry particles of dung. On the other hand, two samples taken some distance off the main road to Aboukir, in apparently clean desert localities, did not develop amœbæ in culture until the sixth and eighth days respectively. The only sample of sand which did not develop any protozoa in culture was taken at an exceptionally clean place to which large animals could not gain access. This sand also looked particularly clean and pure and free from particles of dry dung. Samples of sand taken from the seashore within the reach of the tide developed no amœbæ in culture on two occasions. A species of infusorian developed, however, and also some bacteria. Bacteria developed in all samples. This is sufficient to show that protozoa are present in the dry sand probably all over Egypt, more especially in the vicinity of towns and habitations, where the sand is contaminated by the excrement of man and animals. No doubt the spores or cysts are blown far and wide by the wind from contaminated areas to areas which were free, but it appears probable that the sand in lonely places far from man and animals will contain none, or at least few of these protozoa. Dr. C. Todd, of Cairo, states that he has taken samples of sand far out into the desert and found that these contained numerous bacteria, but it did not occur to him to examine for the presence of protozoal organisms. Professor Ferguson, of Cairo, has also conducted experiments which show that the sand blown from the south by the "khamseen" winds is heavily infected with bacterial organisms.

(VII) THE EFFECT OF MOISTENING AND FLOODING THE SAND WITH WATER.

When sand is moistened or flooded with water and kept in the dark no active protozoa are, as a rule, detected until about the fifth day. By that time flagellates and infusoria may appear, but we have not been able to find amœbæ till about the third week. Of course, they may be present in active form before that time, but in numbers too few to be detected. One sample of sand covered with sterile water in a flask and kept in the light showed no signs of active amœbæ or flagellates on the fourteenth day. By that time a greenish scum had developed, and samples on microscopic examination showed minute diatoms and green vegetable filaments; also a curious protozoan containing chlorophyll was abundantly present. After about three weeks, however, active amœbæ and flagellates were found and other protozoal parasites which were preying upon each other. At least two kinds of amœbæ were present, a very large one corresponding to *Amœba proteus,* and one much smaller in size. It seems possible that this smaller type is the *Amœba limax,* since it resembles it in size and appearance both in fresh and in stained specimens. Further work is, however, in progress with regard to this point. At any rate, if this smaller amœba is not the actual *limax,* nevertheless the real *limax* type is still present, since agar plates inoculated with this watered sand show in a few days a profuse growth of amœbæ identical with the growth of *Amœba limax* obtained from the dry sand. We are forced to conclude, therefore, that the *limax* amœba is not injured by excess of water. In these samples of flooded sand definite cysts like amœba cysts were found. This shows that a cyst is not a mere resting stage to tide over a drought, but that it is a definite phase in the life-history of the protozoa. From these experiments it seems to us that the effect of rain showers on the sand in Egypt must be insufficient to give the amœbæ a chance to develop and multiply unless water pools of several days' duration are formed. Since this hardly ever occurs in Egypt, it seems reasonable to conclude that the ordinary sand is not their real habitat where they can multiply and complete their life-history. With the flagellates this may be possible — due to rain showers. It is necessary to state here that we were unable to obtain any protozoa from the Alexandrian tap-water by culture methods, and it will be noted that in some of the above experiments we used sterile water.

(VIII) THE SAND PROTOZOA ARE FOR THE MOST PART NATURAL FREE-LIVING AQUATIC ORGANISMS, BUT SOME OF THEM ARE CAPABLE OF LIVING A PARASITIC LIFE IN THE INTESTINE OF MAN AND ANIMALS. THE LATTER HAVE AN AFFINITY TO FÆCAL MATTER WHICH IS A GREAT AID TO THEIR GROWTH AND MULTIPLICATION IN THE FREE STATE.

As already stated, it was found that when sterile water and sand are kept in the light in a glass vessel, numerous active protozoa begin to develop after about the fifth day onwards. The first to appear are certain infusoria and flagellates, and also spirochætes. After a fortnight to three weeks, diatoms and vegetable filaments are noticed, and also numerous protozoa containing chlorophyll, and showing a bright green colour. Later still amœbæ (*proteus* and *limax ?*) are found, and also further species of flagellates and infusoria. Identical organisms were found in a stagnant pool of some weeks' duration in Alexandria, and presumably these are present also in all stagnant waters in Egypt, such as sluggish streams, canals, and irrigation ditches, &c.

We conclude that the following latent life exists in the Egyptian sand in the form of spores or cysts :—

(*a*) *Vegetable.*—(1) Diatoms : several kinds. (2) Vegetable filaments : several species. (3) Moulds : several varieties. (4) Bacteria and cocci : many varieties.

(*b*) *Spirochætes.*—At least two or three varieties.

(*c*) *Protozoa.*—(1) Amœbæ : at least two species. (2) Flagellates : at least four species. (3) Ciliates and infusoria : at least eight to ten species. (4) Heliozoa : one species.

Our observations have shown that these protozoal forms of life multiply in the sand and water, many of them undergoing complicated life-cycles ; we therefore conclude that they are for the most part free-living and aquatic in habit. We have, however, traced three of these protozoa—viz., *Amœba limax,* one or more small flagellates (a mono-

and a bi-flagellate) and an infusorian resembling a Balantidium of the horse. A sample of horse-dung taken before it reached the sand was found on examination by fresh film to contain an amœba, flagellates, and large "balantidium-like" cysts. A portion of this dung was moistened with sterile bouillon, and another part was inoculated on to an agar slope. Both developed numerous flagellates on the third day identical with those obtained from the sand; later the bouillon culture also developed *Amœba limax* and infusoria of a balantidium type. It is well known that *limax* amœbæ are occasionally found in human stools, and Lieutenants J. G. Thomson and Bartlett, working at No. — General Hospital, Alexandria, have occasionally found a heliozoan-like organism in the stools of patients suffering from diarrhœa, which showed a strong resemblance to that found in our sand aquarium. We must therefore conclude that several of these sand organisms are capable of living a parasitic existence in the intestine of man and animals, and if they do no harm thereby, at any rate they certainly do no good. It is also noteworthy that the *Amœba limax*, found occasionally in the intestine of man, and the flagellates and infusorian traced to the horse are precisely the same organisms which grow so abundantly in the deposits of dysenteric fæces placed on the sand in our first experiments. Also these are the only protozoa which grow well on the agar and bouillon cultures from the sand, and they certainly appear in much greater numbers in the fæces, bouillon, and agar than in the sand aquarium. They grow and multiply rapidly in all deposits of human fæces or horse-dung on sand. The horses in Egypt swallow large quantities of sand; sand colic is a common complaint with them, and sometimes causes death. In such cases, if a post-mortem is performed, very large quantities of sand are found in their large intestine. Horses, at least, must therefore act as a kind of culture incubator for several of the sand organisms. It is certain that deposits of horse-dung and human fæces must add greatly to the numbers, since they grow into these deposits from the sand, and multiply abundantly in them. We conclude, therefore, that the protozoal cysts and spores in the Egyptian sand are derived partly from the fæcal contamination of man and animals, and also from the dried-up sludge of stagnant water-pools, ditches, and canals which has been blown about far and wide by the wind.

(IX) HOW LONG CAN THE CYSTS OR SPORES LIVE IN THE PASSIVE STATE?

This is a difficult question to answer accurately. It is certain that they retain their vitality for months in the dry sand. It seems highly probable that they live in this passive state for years, and possibly for very many years.

It will be noted that throughout we have used the terms "cysts" or "spores." It is certain that true protozoal cysts exist in the sand, as we have observed them in sand washings. It is, however, also probable that some of the protozoa lie latent in the sand as small spores, since we have noticed that some of them develop spores at a certain stage of their life-cycle in the sand aquarium.

(X) FURTHER EXPERIMENTS AND OBSERVATIONS.

(*a*) *The Effect of Excess of Bouillon.*—We have already stated that certain of the protozoa grow well when the sand is simply moistened with the bouillon. If, however, the bouillon is poured on the sand in quantity so as form a layer of ½ in. or more deep, no protozoa will develop. This can only be explained by supposing that these protozoa are aerobic organisms, and that excess of bouillon shuts off the supply of oxygen. In one experiment the sand was covered with excess of bouillon for fourteen days. During this time no protozoa developed, but after the excess of bouillon was poured off, flagellates developed after three, and amœbæ after four, days, thus proving that the excess of bouillon did not kill off these organisms.

(*b*) *Reaction of the Cultures and the Optimum Temperature.*—In all cases in which the amœbæ grew successfully the reaction of the cultures was faintly alkaline. The deposits of dysenteric stools placed on sand, and in which the *Amœba limax* grew so well, were distinctly alkaline. Neither the amœbæ nor flagellates appeared to grow on McConkey's medium. With regard to the optimum temperature, they appeared to grow best when the average temperature of the laboratory was about 80° F. They also grow well in cultures when the temperature is as low as 70° F. and even 60° F., but the growth at these temperatures is slower. Sand and water kept in an ice-chest failed to develop many protozoa. The temperature of this ice-chest averaged about 55° F.

This would indicate that the protozoa found in the sand in hot climates will not develop well in a climate which is colder. On the other hand, the amœbæ did not grow well in an incubator at blood heat.

(*c*) *Quantitative Experiments.*—With regard to the sand outside our laboratory, if minute deposits of a few grains each (about 1 c.mm.) were placed at intervals on an agar plate, amœbæ, as a rule, did not grow from all of these deposits. We are fairly safe in stating, however, that amœbæ would always grow from a spread of sand, the grains of which would aggregate 30 c.mm. This sand must therefore have contained about 100 amœbæ cysts per cubic centimetre. The numbers in the sand in different looalities must, of course, vary. The sample of sand taken near the dung-heap, as referred to above, evidently contained many more amœbæ and flagellates than the samples taken in the clean desert some distance from the Aboukir road.

(*d*) *Examination of Dust in Hospital Ward.*— A small sample of dust from one of the wards in No. — General Hospital was placed on a nutrient agar plate. In a few days a growth of *Amœba limax* appeared. This was probably due to the presence of fine granules of sand in the dust.

(*e*) *The Effect of Chlorination.*—About 50 c.mm. of sand were placed in a basin and one gallon of water was added. This was stirred up thoroughly, and chloride of lime added in a quantity corresponding to the amount used in the sterilization of the water in the Army water-carts—viz., 3 grm. of chloride of lime to 100 to 140 gallons of water. After twelve hours a small quantity of the treated sand from the basin was placed on an agar plate, and both amœbæ and flagellates appeared in abundance in a few days. This shows that the ordinary chlorination is insufficient to kill the sand organisms in a mixture of sand and water.

(XI) DESCRIPTION OF THE *AMŒBA LIMAX* AS SEEN ON FRESH AND STAINED FILMS.

In fresh films the amœbæ usually showed active movement, progressing as a rule in one direction in a slug-like fashion. At other times they are more stationary and are capable of throwing out long pseudopodia in various directions. Their movement, in fact, varies according to the nature of the medium in which they are living. In mucous dysenteric fæces they showed typical slug-like movement; in the bouillon cultures they showed often a more straggling movement, whilst on the agar cultures their form of movement was somewhat midway between these two extremes. The actual growths of the amœbæ are whitish in colour; this growth, however, is always mixed with cocci and bacteria. On the agar plates the amœbæ on microscopic examination have a slightly greenish tinge, but in cover-slip films containing a drop of water they appear greyish-white and translucent. Often it is difficult to distinguish the ectoplasm from the endoplasm, except when pseudopodia are extruded. The nucleus is usually clearly seen and consists of a dense round central mass surrounded by a clear halo. The amœbæ are sometimes also seen to contain a contractile vacuole. Sometimes the endoplasm is seen to contain cocci and other ingested material lying within vacuoles; at other times the endoplasm is almost clear and homogeneous. The cysts, as a rule, show one distinct central nucleus with granular protoplasm around it and a definite cyst wall with double contour. The cyst wall is sometimes very thick, and, when very dry, the whole cyst may show an irregular and shrivelled outline.

In Giemsa-stained films the amœbæ are seen to vary considerably in size from about 5 μ to 25 μ in diameter. The whole protoplasm may stain bluish, but sometimes the ectoplasm may show a reddish tint. Sometimes the protoplasm contains much ingested material and is highly vacuolated, at other times it is comparatively homogeneous. The nucleus, as a rule, is seen to consist of a red staining reticulum with blue interstices. More rarely it shows a homogeneous bluish centre with a red margin.

Specimens prepared by wet fixation (Schaudinn's fluid) and stained with hæmatoxylin show, as a rule, a finely reticulated protoplasm with no demarcation between endo- and ectoplasm. The nucleus is always a very definite structure consisting of a dark homogeneous round body surrounded by a clear halo, which, in turn, is bounded by a thin dark line. In these specimens the amœba is observed to be capable of multiplying in two ways. The most common way is by simple division of the cell into two daughter cells. More rarely, however, the nucleus splits into four or more portions and then the cell splits up into four or more daughter amœbæ.

In the deposits of dysenteric stools on the sand it was observed that the *limax* amœbæ were at first large active vegetative forms; day by day, however, their size and activity diminished as the medium became exhausted. Eventually their size dwindled to from 5 μ to 10 μ in diameter and they became to all appearances inactive. Stained specimens at this stage showed that these small amœbæ contained large dark-staining granules which often lay around the nucleus in the form of a ring. The actual nucleus in these small forms was also changed, in that the dark-staining central portion was much reduced in size so as to resemble a centriole, and the dark-staining granules were often arranged around it in the form of a definite ring. It seems likely that these small forms indicated a stage just prior to encystment.

(XII) NOTES ON THE FLAGELLATES AND "BALANTIDIA-LIKE" INFUSORIAN.

With regard to these we are not yet prepared to make any very definite statements. The more we have studied these sand organisms (amœbæ included) the more we feel that their life-histories are much more complex than would at first appear. The fact that the sand contains so many varieties of protozoa, each capable of passing through different phases of life, makes it exceedingly difficult to follow definitely the phases of any particular one.

With regard to the flagellates which appeared in the cultures, they as a rule measured about 5 μ in length, but much smaller forms were sometimes seen. Usually they were pyriform in shape, but sometimes long slender varieties were seen. Some contained one flagellum and some two flagella. When the medium dried up they became rounded and apparently temporarily encysted; if a drop of moisture were then added, they rapidly hatched out again into free-swimming forms.

The "balantidium-like" organism was in the free-swimming form, pyriform in shape and measured as a rule from 30 μ to 40 μ in length. It had a large round macro-nucleus with a small micro-nucleus in close apposition to it. It also contained a contractile vacuole. When the medium dried up it became encysted. These cysts varied very much in size and the cyst wall was sometimes 2 μ to 3 μ in thickness. Within these cysts we observed that four daughter organisms developed, which hatched out when water was added. They were also capable of temporary encystment when the medium became too dry, but when fresh moisture was added they hatched out quickly into one free-swimming organism.

(XIII) EXPERIMENTS ON KITTENS.

The fæces of three normal kittens were examined and found to be free from protozoa, but spirochætes were sometimes present. On three occasions we injected ½ c.c. of sand into the rectum of one kitten with no harmful results, and no amœbæ or other protozoa developed in its fæces afterwards. The remaining two kittens were fed on dried-up cultures from the sand, containing cysts of *Amœba limax* and flagellates. They did not appear to suffer any harm in consequence, and no amœbæ or flagellates were found in their stools afterwards. Possibly, therefore, these organisms were not pathogenic to kittens.

(XIV) THE BEARING OF THIS RESEARCH ON THE PROBLEMS OF THE SPREAD OF AMŒBIC DYSENTERY AND THE FLAGELLATE DIARRHŒAS.

It is not known whether amœbic dysentery and the flagellate diarrhœas due to *Lamblia, Trichomonas*, or *Cercomonas* are transmitted from man to man by actual contamination of the fingers, by water, by sand and dust, or by flies. All that is known is that the cysts, which are sometimes passed in the stools, are infective. There is a difference of opinion as to how long these cysts live outside the body after they are passed in the fæces; neither do we know with any certainty whether or no they pass through any developmental phase in water. It has been stated that *Trichomonas* infections have been traced to water-tanks. The difficulty of tracing these organisms is due to the fact that we cannot yet cultivate them successfully on artificial media. From our investigations on the sand protozoa, however, it would seem probable that the cysts of the pathogenic amœbæ and intestinal flagellates may live in sand and dust for a considerable time, and that also they may survive and even pass through a phase of their existence in water or mud. Since one of the sand flagellates has been traced to the horse, and since the *Amœba limax* has frequently been found in abundance in the human intestine and has a strong affinity to fæces, we considered that it would be profitable to study thoroughly the mode of life of these organisms, as thereby we might gain some idea as to the probable ways in which the corresponding pathogenic organisms were carried from man to man and the mode of their existence outside the body during that transference. So far our investigations have shown clearly that one should endeavour to prevent the contamination of water and sand with fæcal material. In Alexandria at present the sand along the whole sea-front is, in reality, one vast latrine, on which hundreds of fæcal deposits are made nightly by the natives. This applies to the dry sand all over Egypt, so that one can hardly hope to attack successfully the prevention of amœbic dysentery and the flagellate diarrhœas until this state of affairs is remedied, at least in the larger towns. In Alexandria at present the main sewer, which runs along the sea front, has to be emptied at intervals. This is done by means of a rope and bucket, and during this procedure the sand around the manholes gets highly contaminated with sewage. Since the prevailing wind comes from the sea, the dry, fæcal-contaminated sand along this unfortunate promenade is blown right into the town itself.

In conclusion, we wish to emphasize once more the great importance of avoiding the contamination of dry sand in hot climates. Not only human fæcal matter but horse-dung should be disposed of with exceeding great care. Where there is no proper sewage system, the latrines should be dug very deep, or better still, the fæces should be passed into metal buckets and kept thoroughly moist with antiseptic fluid, such as cresol or an emulsion of one of the crude oils. Flies will not land on the contents of the buckets treated in this way, nor will the fæcal matter dry up and be blown about. The toilet paper in the buckets should be set on fire several times daily, and the hands should be rinsed in antiseptic lotion after each defæcation. The contents of the buckets should be buried deeply, or, better still, burnt in a destructor. Horse-dung should certainly be burnt. In this way and this alone can dysentery and the flagellate diarrhœas be prevented, whether for an army in the field or for a civil community. The Sanitary Commission, we understand, came to the conclusion that the shallow latrine system was useless and even dangerous in dry sand, since the dried fæces in such latrines were scooped out and blown about by the action of the wind.

With regard to the fly problem it should be remembered that house-flies breed mostly in fæcal matter and dung, so that the more carefully these are disposed of in the way we have indicated the more impossible it is for house-flies to exist. The larger flies of the *Sarcophidæ* type, however, breed in decaying animal matter, such as dead bodies. We have hatched out such flies from the maggots which developed in pieces of dysenteric intestines, but we found no evidence that these flies, in

EXPLANATION OF PLATE.

All figures are drawn to the same scale with Leitz drawing apparatus. Lenses employed: $\frac{1}{7}$ in. Zeiss oil immersion and No. 12 *Zeiss compensating ocular. Magnification* 1,350 *diameters. All represent Giemsa-stained specimens except figs.* 12 *and* 13, *which were drawn from films stained with iron-hæmatoxylin (Schaudinn's wet-fixation method).*

FIG. 1.—*Amœba limax* from sand moistened with sterile bouillon, after standing two days at room temperature (about 80° F.).

FIGS. 2, 3, and 4.—*Limax* amœbæ from the slimy deposits of dysenteric stools on sand, third day. Note the ingested bacilli and cocci.

FIG. 4.—Showing an exceptionally large nucleus.

FIG. 5.—Showing pre-cystic stage of *Amœba limax*, from the same culture as fig. 3, on the fourth and fifth day, when the slimy deposit was beginning to dry. Note the small size of the amœba and the presence of dark granules in the protoplasm.

FIG. 6.—Ditto, on the sixth and seventh days; amœbæ still smaller.

FIG. 7.—Showing an encysted *Amœba limax*, from a deposit of dysenteric stool on sand which has dried up. Note that the cyst has only one nucleus.

FIG. 8.—Encysted *Amœba limax* from a similar specimen. Note the thick cyst wall.

FIGS. 9 and 10.—*Limax* amœbæ from an agar culture of sand, third day, at room temperature. Fig. 10, showing vacuoles containing the remnants of bacilli, &c., is very characteristic.

FIG. 11.—*Amœba limax* from deposit of dysenteric stool on sand, fourth day.

FIG. 12.—*Amœba limax* from agar culture of sand, fourth day, stained by Schaudinn's method.

FIG. 13.—Amœba from agar culture of sand, fourth day. Note the large size with double nucleus.

FIG. 14.—"Balantidium-like" infusorian from agar culture of sand. Cilia not seen because it has commenced to encyst. The fully developed cysts have a very thick wall.

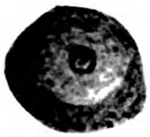
FIG. 15.—Mono-flagellate from sand moistened with bouillon, third day.

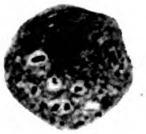
FIG. 16.—Bi-flagellate from sample of sand taken at a depth of 1 ft. (sand moistened with bouillon, third day, at room temperature).

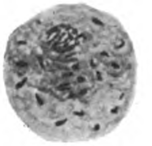
FIG. 17.—Flagellate showing four flagellæ—probably two bi-flagellates hatching out from a cyst—from a bouillon-sand culture.

FIG. 18.—Showing a normal human red cell—same magnification—for the purpose of comparison in size.

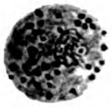
N.B.—Flagellates identical with the above were also found in fresh horse-dung. Also horse-dung, when moistened with sterile bouillon, developed *Amœba limax*, and also a "balantidium-like" infusorian similar to that shown in fig. 14.


1


2


3

4


5

6

7

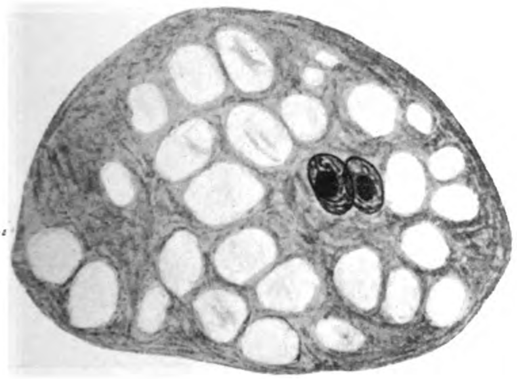
8

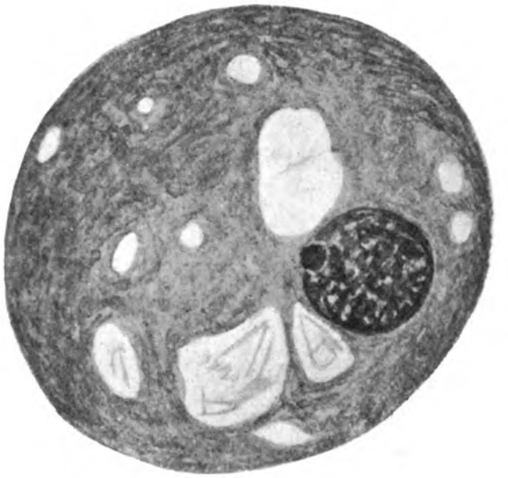
9

10

11

12


13


14

15

16

17

18

consequence, harboured the pathogenic amœba of dysentery. It is unlikely, therefore, that the flies developing from dead bodies can carry the germ of amœbic dysentery to food, unless they have previously alighted on dysenteric stools; so that here again we are forced to the conclusion that the proper disposal of fæces means no dysentery. Dry, contaminated sand cannot be prevented from blowing about everywhere. It gets into the mouth and into food; it also gets into water supplies, and we have shown that ordinary chlorination of water containing sand does not kill the protozoal cysts present in it. Boiling or porcelain filtration alone can render such water safe. The one and only proper way to prevent these intestinal scourges is a highly efficient organization for the thorough and rapid disposal of fæcal matter. This should be insisted upon in armies and enforced as far as possible, with local modifications, upon native communities.[1]

---

[1] We have confined ourselves in this paper to our own studies. Much previous work has, of course, been already done on "soil amœbæ."

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

SECTION OF THE HISTORY OF MEDICINE

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Section of the History of Medicine.

OFFICERS FOR THE SESSION 1915-16.

President—

NORMAN MOORE, M.D.

Vice-Presidents—

HENRY BARNES, M.D.
RICHARD CATON, M.D.
Sir HENRY MORRIS, Bt., F.R.C.S.
Sir WILLIAM OSLER, Bt., M.D., F.R.S.
Sir RONALD ROSS, K.C.B., F.R.S.
Sir FREDERICK TREVES, Bt., G.C.V.O., C.B., F.R.C.S.

Hon. Secretaries—

LEONARD G. GUTHRIE, M.D.
J. D. ROLLESTON, M.D.

Other Members of Council—

DUDLEY W. BUXTON, M.D.
Sir JOHN WILLIAM BYERS, M.D.
A. J. CHALMERS, M.D.
F. W. COCK, M.D.
RAYMOND CRAWFURD, M.D.
ALBAN DORAN, F.R.C.S.
DAVID FORSYTH, M.D.
JAMES GALLOWAY, M.D.
E. MUIRHEAD LITTLE, F.R.C.S.
R. O. MOON, M.D.
Sir SHIRLEY F. MURPHY, F.R.C.S.
J. A. NIXON, M.B.
GEORGE C. PEACHEY.
D'ARCY POWER, F.R.C.S.
F. M. SANDWITH, M.D.
CHARLES SINGER, M.D.
GEORGE W. STEEVES, M.D.
C. J. S. THOMPSON.
P. MACLEOD YEARSLEY, F.R.C.S.

Representative on Library Committee—

RAYMOND CRAWFURD, M.D.

Representative on Editorial Committee—

LEONARD G. GUTHRIE, M.D.

SECTION OF THE HISTORY OF MEDICINE.

CONTENTS.

PAGE

Paracelsus and Van Helmont. By C. A. MERCIER, M.D., F.R.C.P. 1

November 17, 1915.

Harvey. By NORMAN MOORE, M.D. 9

By HENRY BARNES, M.D.

(1) Note on an Autograph Letter describing Inoculation of Small-pox in Carlisle in 1755 21

(2) On Anthony Askew, M.D., F.R.S., and his Library 23

An Account of a Remarkable Sacred Potion Bowl from Tahiti. By B. GLANVILL CORNEY, I.S.O. 27

By CHARLES SINGER, M.D.

(1) Thirteenth Century Miniatures illustrating Medical Practice ... 29

(2) A Thirteenth Century Drawing of the Anatomy of the Uterus and Adnexa 43

A hitherto Unpublished Portrait of Bellini. By Professor CHARLES GREENE CUMSTON, M.S. (Geneva) 47

December 15, 1915.

Of Superstitions concerning Menstruation. By RAYMOND CRAWFURD, M.A., M.D.Oxon., F.R.C.P.Lond. 49

Some Notes on Edmund Harman, King's Barber, 1509 (?) to 1576. By D'ARCY POWER, F.S.A., F.R.C.S.Eng. 67

January 19, 1916.

PAGE

The Rate of Mortality in the British Army 100 Years ago. By **Arnold Chaplin**, M.D., F.R.C.P. 89

Joshua Ward, 1685-1761. By H. **Selfe Bennett**, M.B. 100

February 16, 1916.

The Portrait of Paracelsus at the Museum at St. Gall, Switzerland. By Professor **Charles Greene Cumston**, M.D. (Geneva) 113

Marat. By C. **Edward Wallis**, M.R.C.S., L.R.C.P., L.D.S. 116

A Sixteenth-Century Oculist. By **Percy Dunn**, F.R.C.S. 120

Folk Cures by Constriction and Rings, with a Digression into the Nature of the Soul. By **Dan McKenzie**, M.D. 143

March 15, 1916.

Sir John Finch and Sir Thomas Baines. By **Archibald Malloch**, Captain C.A.M.C. 155

Some Plague Tractates (Fourteenth and Fifteenth Centuries). By **Dorothea Waley Singer** 159

Note on a Thirteenth-century Diagram of the Male Genitalia. (*Communicated and taken as read.*) By **Charles Singer**, M.D. 212

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

John Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

Section of the History of Medicine.

Paracelsus and Van Helmont.[1]

By C. A. Mercier, M.D., F.R.C.P.

THESE two physicians of the sixteenth and seventeenth centuries present such remarkable similarities and contrasts that it would be easy to construct, with regard to them, one of those antithetic descriptions in which Macaulay used to delight. They were a very remarkable pair, and though neither made any real contribution to knowledge, or any discovery of the slightest value, their influence upon medicine is by no means neglectable; and though their method—if method that can be called which is a mere riot of extravagant speculation without an atom of basis in fact, a mere debauch of diseased imagination—is the direct antithesis of Harvey's method of searching out the secrets of Nature by observation and experiment, yet it is doubtful whether Harvey's great discoveries would have been accepted as soon as they were had not Paracelsus and Van Helmont preceded him. Van Helmont was, indeed, a contemporary of Harvey, having been born only one year before the father of modern medicine, but Harvey's great treatise, "De Motu Cordis," was not published till 1628, when Van Helmont had already been publishing for twenty years.

Paracelsus and Van Helmont had many qualities in common, and in them some of these qualities were developed to a pitch that has rarely, if ever, been equalled. Both of them carried arrogance and self-conceit almost to the point of insanity; both were extremely effective in their criticisms of the then accepted doctrines; both revelled in the wildest speculations, and taught their mad conjectures as unassailable truths, though neither adduced one atom of fact or one shred of reasoning in support of their frantic surmises; both were bitter and unscrupulous controversialists, and were constantly engaged in controversy; both were mystics; the writings of both are so confused and obscure as to be often quite unintelligible; both were braggarts, scorners of authority, and rebels against the orthodox system of medicine; but, in spite of these similarities, there were wide differences between them. Paracelsus was grossly ignorant; Van Helmont was very learned. The polemic of Paracelsus was vulgar and scurrilous; that of Van Helmont, while equally bitter, was scholarly and gentlemanly. Paracelsus stole from everyone, and accused everyone of stealing from him; Van Helmont stole from Paracelsus only. Paracelsus was a quack in the fullest sense of the word: he pretended to knowledge that he did not possess; he exploited his system for profit; he professed to cure everyone and everything; and he was obscure of set purpose, with intent to mystify and deceive. Van Helmont really believed in himself and his system; he was quite disinterested, and his obscurity of diction was the natural expression of the confusion that reigned in his mind. Paracelsus was an astrologer; Van Helmont never mentions the influence of the stars.

---

[1] Owing to the absence of the author this paper was not read at the closing meeting of the Section last Session.

No coherent or intelligible account of the doctrines of Paracelsus can be given, for they were neither coherent nor always intelligible: and this is not to be wondered at if we accept the evidence of his secretary and amanuensis, Oporin, that Paracelsus scarcely ever lectured except when he was half drunk, or dictated to his amanuensis but when he was more than half drunk, or attended a patient until he was wholly drunk. Some notion of his modesty may be obtained from the fact that he began his first course of lectures in the University of Bâle by burning in public the works of Galen and of Avicenna, at the same time assuring the crowd of students who flocked to hear him that his shoe-strings knew more of medicine than these venerable authorities, and that all the universities and all the authorities put together knew less of medicine than the hairs of his beard. The statement gathered an added piquancy from the fact that Paracelsus was a eunuch, and had no beard to speak of. He himself, he declared, was the true monarch of medicine. "You will follow me," he cried, "you Avicenna, Galen, Rhazes, Montagna, Mésué. You will follow me, messieurs of Paris, of Montpellier, of Germany, of Cologne, of Vienna, and all, however many you be; you who inhabit the isles of the sea; you also, Italians, Dalmatians, Athenians; you Greek, you Arab, you Jew, follow me, your king!" In spite of this claptrap he numbered among his patients many distinguished men, among them so able and sensible a man as

Erasmus. His net was cast very wide, to scoop in all sorts and conditions of men. He propitiated the pious by declaring that he founded his system on Holy Scripture; that the Bible is the key to his theory of disease, which is founded on the Apocalypse. The man, he declared, who submits blindly to the Divine Will, and who identifies himself with the celestial intelligences, possesses the philosopher's stone, can cure every ill, and can prolong his life at will, because he possesses the tincture used by Adam and the patriarchs before the Deluge to prolong their lives for eight or nine centuries; and he left no doubt on the minds of his hearers that this gifted person was himself. To the sceptic he professed the grossest pantheism; to the credulous he posed as a magician, declared that he had received letters from Galen, and had visited Avicenna at the gates of Hell; and he gulled them with his accounts of drinkable gold, the philosopher's stone, the quintessence, the mithridate, and so forth.

His main principle, if it can be called a principle, was to contradict everything that had been said by his predecessors. But he merely contradicted them; he did not demand the evidence on which their statements were founded, or the reasons that could be advanced in their favour, a method by which he could have destroyed them very effectually. So far from doing this, he merely opposed his own authority to the authority of his predecessors. Whatever they said was so he declared was not so, and the one statement was as devoid of testimony as the other. He had the temerity to ridicule the humoral pathology, sanctioned as this was by the approval of a score of centuries. He denied that the humours produce disease, and declared that if the humours had any existence, which he denied, they were the results and not the causes of disease. The humoral pathology was bound up with the doctrine of the four elements—fire, air, earth and water—and with the four corresponding elementary qualities—heat, cold, dryness, and moisture; and these, he declared, are not, as they were assumed to be, the causes of disease. "A crowd of physicians," he says, and it is almost the only true thing he does say, "rise up against me. From them come the names bile, melancholy, phlegm, and blood. But who has seen bile in Nature? How can phlegm resemble one of the elements? How does blood resemble air? You say this is a vice of the blood, and that of the liver; but what, I pray you, has given you such lynx eyes as to know so well that the blood or the liver is the cause when you are utterly ignorant of the nature of the blood?" This is all very well, and if he restricted himself to such destructive criticism we should regard him with admiration for his defiance and questioning of authority; but, unhappily, his criticism is but a peg on which to hang absurdities tenfold more absurd than those that he demolished. He goes on: "Instead of saying this is due to bile, that to melancholy, we ought to say this is due to arsenic, that to alum, and also, this is under the influence of Saturn, that of Mars; in fact, half the disease comes from the earth and half from the heaven. You say that the disease is due to the blood, but the blood is no more than wood, and as there are several kinds of wood, so there are just as many kinds of blood; and just as the heaven sends the trees to sleep in winter and wakes them in summer, so, by a similar action, the blood goes through similar seasonal changes. From which it follows that a physician ought to say this disease is turpentine, that is mountain celery, the other is hellebore, and not this is phlegm, that is rheum, a coryza, a catarrh. The names do not rest on a medical foundation."

Some notion of the quality of his positive doctrines may be gathered from this specimen, but the chief doctrines with which he is identified are those of the entities, the archæus, and the tartarian or calculous origin of disease. Consistency was not one of the virtues of Paracelsus, and it is quite in accordance with his methods to teach first that the sole causes of disease are the entities, second that its sole cause is the archæus, and third that its sole cause is the precipitation of tartar.

The entities are five in number — the *ens astrorum*, the *ens venenorum*, the *ens naturale*, the *ens potentibus spiritibus*, and the *ens Dei*, and since there are five entities, and since all diseases are produced by them, therefore there must be five phlegms, five hydropathies, five jaundices, five fevers, five cancers, and so forth. The reasoning reminds us of the *Quicunque vult.*

The same diseases that can be produced by the entities only can be produced by tartar also. Every terrestrial moisture has incorporated with it a substance that is prone to coagulate. Wine, for instance, is a product of the earth, and when it is kept coagulation takes place, and the clot separates from the wine and adheres to the side of the vessel. This is the tartar of wine. Water also contains a tartar, which is separated by boiling, and adheres to the sides of the kettle. Tartar of milk separates from milk, and so of all vegetables. Similarly the urine contains a tartar which separates as renal or vesical calculus. The bile contains a tartar which separates to form gall-stones, and the blood contains a tartar which separates in the form of clot.

Van Helmont had the same contempt for authority as Paracelsus, though he does not express it so boisterously, and although he adopts without any acknowledgment the Paracelsian doctrines of the archæus and the tartar, he is as contemptuous of the authority of Paracelsus as of the authority of any of his predecessors. The maxim "suum cuique" is of very recent origin as far as medicine is concerned, and is even now not thoroughly established. Brunus introduces his description of the treatment of fractured clavicle with the words *operatio mea est*, and takes it word for word from Abdulcasis, bk. iii, c. 5, who takes it word for word from Paulus Ægineta, who takes it word for word from someone else. Van Helmont mocks at Paracelsus for believing that a cooked stork can change itself into a serpent, but he himself maintains the spontaneous generation, not only of lice, worms and scorpions, but even of mice. He ridicules the established practice of administering the dried and powdered lung of the fox in pneumonia, a practice founded on the principle that the lung of an animal of such speed and staying power must communicate its virtue to the lung of the sick. If he opposed the practice because there is no evidence of its efficacy and it is abhorrent to common-sense, one could sympathize with him; but it is evident that his opposition rests on no such ground, for he prescribed and himself took for pleurisy the blood of a buck, provided it were drawn from the wound of a castration made while the buck was suspended by the horns with the hind feet tied to them.

As I have said, Paracelsus invented the archæus, which is not the soul, but a kind of regulating deity which resides at the cardiac orifice of the stomach and from thence directs and governs the physiological processes of the body. Van Helmont adopted the archæus and elaborated it. According to him, everything in Nature possessed an aura, which appears in plants as juice and sap, in metals is inspissated into a dense homogeneity, and so forth. The human archæus is composed of this aura united with a seminal image, which is an internal spiritual nucleus containing the fecundity of the sperm. It penetrates into all the recesses of the body and transforms the matter that it finds there in accordance with the entelechy of its image. It finds a place for the heart here and for the brain there. And this is not all. Every part of the body has its own archæus, which obeys or should obey the central archæus. As long as they are duly subservient, health is preserved, but when any of them rebels, the consequence is disease, which varies of course with the seat of the revolting archæus; and this is how diseases are produced.

Van Helmont was no more consistent than Paracelsus or than a modern professor of Logic, and he soon contradicts himself. Although the archæus is the supreme director of the bodily processes, and is the sensitive soul as distinguished from the immortal soul, yet it has a partner with co-ordinate powers in the spleen, which is "the sun, the director, and the cook" of the ferment of the stomach. It follows that the spleen and the stomach together form a duumvirate government of the body, and of this government the brain is the executive. Moreover, although, as we have seen, the rebellion of the subordinate archæi is the sole cause of disease, yet the causes of disease are of two kinds—those proper to the archæus and those external to it. The former are intrinsic and arise without foreign agency; the latter are such as wounds, poisons, and obliteration of natural channels. Even these, however, do not exhaust the *causæ morborum*, for epilepsy, we are told, is due to an hilarious and narcotic virus which arises in the neighbourhood of the stomach, and paralyses for the time being the action of the duumvirate. The archæus of the head, attacked by the virus, produces virulent ideas, which, in becoming realized, determine the height of the disease. These different doctrines can scarcely be made to harmonize, nor are they made more harmonious when we are told that disease is a "being really subsisting in an invisible principle, a being endowed with various properties."

Van Helmont disbelieved, or affected to disbelieve, every statement made by his predecessors, and as he is reported to have read six hundred Greek, Latin, and Arab authors, besides Hippocrates and Galen, his scepticism had a wide embrace. It had its limits, however, as we have already seen in his remedy for pleurisy, and as may be judged by the following case which he relates on the evidence of eye-witnesses. A native of Brussels having had the misfortune to lose his nose in a duel, a Tagliacotian operation was successfully performed, the necessary skin being furnished from the arm of a servant. Thirteen months afterwards the new organ turned deadly cold; all efforts to preserve its animal heat were fruitless, and in a few days it putrified. It was afterwards found that at the moment the nose turned cold the servant had died.

It may seem an unwarrantable boldness to claim for the authors of such wretched stuff as was produced by Paracelsus and Van Helmont any influence in preparing the way for the acceptance of the doctrines of Harvey, but I believe that their influence was considerable, and was exercised in this way. They were almost the first to attack the venerable citadel of authority; they were almost the first who dared to suggest that Hippocrates and Galen had not only left something for others to discover, but were not infallible in what they themselves taught. Paracelsus and Van Helmont made the mistake, indeed, of supposing that the defences of the fortress they attacked were like the walls of Jericho, and would fall at the blast of their trumpets, and truly they blew their own trumpets with vigour enough; but undoubtedly, though they did not demolish the fortifications, they made serious breaches in them. They did teach people to believe that Hippocrates, Galen, and Aristotle were not divinely inspired, and that one might question the truth of their doctrines without being struck dead by lightning for the sacrilege; and this was no small service to the cause of truth. The reverence with which these authorities were regarded is almost incredible, and would be quite incredible were it not that, although Hippocrates and Galen have been deposed from their pride of place, Aristotle yet sits serene, unapproachable, impeccable, enthroned in Olympian majesty. Of him it was asserted by Averroes that "his doctrine is the perfection of truth, and his understanding attained the utmost limit of human ability; so that it might truly be said of him that he was created and given to the world by divine Providence that we might see in him how much it is possible for man to know." This tribute may seem a little exaggerated to the non-academic mind, but it would not be considered at all exaggerated in the University of Oxford, even to-day. What an obstruction to the spread of truth this attitude of mind presents may be seen in two conspicuous instances. In the first place, Galen held that the arteries contain the vital spirits, and that the blood flows out from the heart through the veins.

From these doctrines flow two consequences: First, there must be a hole in the septum between the ventricles of the heart to allow the vital spirits to pass from one ventricle to the other. For fourteen hundred years the existence of this hole was accepted and believed in and asserted by every anatomist, though no such hole exists. The first person to deny its existence was Vesalius, in 1539, and it is very doubtful whether Vesalius would have had the courage to publish his discovery but for the demonstration of Paracelsus and Van Helmont that Galen could be contradicted without fire coming down from heaven to consume his gainsayer. The second consequence of the Galenical doctrine is that as the blood flows outwards along the veins from the heart, there cannot be any valves in the veins to obstruct this outward flow. Therefore, when Amato in 1547 discovered the valve at the opening of the azygos vein into the vena cava, the anatomists, including Fallopius, Vesalius and Eustachius, first denied that any valve exists there, and when they were compelled to admit its existence, they unanimously proved by experiment that it prevents the blood flowing *towards* the heart, as indeed it must if Galen's doctrine is true, and not even the evidence of their senses could convince them that Galen's doctrine is false.

In the second place, though Galen is deposed, Aristotle still reigns; and when proofs are adduced that Aristotle's doctrines are false, proofs as cogent as those that Vesalius and Amato and Fabricius of Acquapendente, brought against the doctrines of Galen, authorities as high in these days as Fallopius and Eustachius were in those still maintain, in the teeth of irrefragable evidence, that Aristotle is right. The professors of Logic in these days, like the professors of anatomy in those, still maintain that there is and must be a hole where no hole can be found, still deny the existence of valves when valves are demonstrated before their eyes; still assert that every argument contains a universal, though in most arguments no universal can be found, still deny the use of verbs, although in every assertion they make use of them. Nor is such obscurantism confined to Logic. Remnants of it still remain in medicine. Alienists still deny that insanity is disorder of conduct, though they witness such disorder in every case of insanity that comes before them; still declare that disorder of mind is insanity, in the face of many mental disorders in which not a trace of insanity can be found.

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*November* 17, 1915.)

Harvey.

By NORMAN MOORE, M.D.

HARVEY'S notes of his lectures delivered to the College of Physicians on Monday, Tuesday, and Wednesday, April 16, 17, and 18, in the year 1616, reveal his varied observations and the general contents of his mind—what he had acquired by reading as well as what he had learned by dissection. The lectures show that he had many books on his shelves, and that those books had often been taken down. The very first writing on the darkened title-page of the notes of 1616 has a far-extended interest. It is a line of the Third Eclogue of Virgil, a remark of Damoetas in his conversation with Palaemon and Menalcas:—

Ab Jove principium, Musae: Jovis omnia plena;

Dryden calls the Bucolics "the rudiments of Virgil's poetry," and apologizes for the roughness of his own translation, yet it is always pleasant to look into his version. These are the lines in the midst of which Harvey's phrase occurs:—

PALAEMON:

Sing then; the shade affords a proper place,
The trees are cloth'd with leaves, the fields with grass;
The blossoms blow, the birds on bushes sing,
And Nature has accomplish'd all the spring.
The challenge to Damoetas shall belong;
Menalcas shall sustain his under song:
Each in his turn your tuneful members bring;
By turns the tuneful Muses love to sing.

DAMOETAS:

From the great father of the gods above
My Muse begins; for all is full of Jove;
To Jove the care of heaven and earth belongs;
My flocks he blesses, and he loves my songs.

MENALCAS:

Me Phoebus loves; for he my Muse inspires,
And, in her songs, the warmth he gave, requires.
For him, the god of shepherds and their sheep,
My blushing hyacinths and my bays I keep.

The shade of the new leaves of the trees, the flowers, the songs of the birds, the wood-pigeon's nest, the green sward on which the companions are seated in this Eclogue, and the time of greatest beauty of the year had, we may easily believe, often come into Harvey's mind in the words of Virgil, as he strolled in the country, and he probably repeated to himself, again and again, fragments from the Bucolics and Georgics which had fixed themselves in his memory. Thus was the frame of mind of this great man of science, as he admired the face of Nature, nearly the same as that of Wordsworth two hundred years later:—

There is a blessing in the air
  Which seems a sense of joy to yield
To the bare trees and mountains bare
  And grass in the green field.

Harvey took his first degree in 1597, and Wordsworth's lines to his sister were written in 1797-98. When Harvey was completing the title-page of his little volume of lecture notes he wrote upon it this line, familiar in his memory, as an indication of the effect and tendency of his studies. Scholars differ as to the precise interpretation of Virgil's words, but I think it is clear that Harvey used it as a general statement of the origin and wonders of the creation: "From God all begins: all things are full of God." The line itself, as the modern editors of Virgil point out, is based on a passage in the "Phaenomena" of Aratus[1]:—

'Εκ Διὸς αρχώμεσθα, τὸν οὐδέποτ᾽ ἄνδρες εῶμεν
῎Αῤῥητον· μεσταὶ δὲ Διὸς πᾶσαι μέν ἀγυιαί,
Πᾱσαι δ᾽ ἀνθρώπων ἀγοραί, μεστὴ δὲ θάλασσα,
Και λιμένες· πάντη δὲ Διὸς κεχρήμεθα πάντες
Τοῦ γὰρ καὶ γένος ἐσμέν.

---

[1] Albertus Forbiger, "Virgilii Opera," 1845, i, p. 50.

St. Paul, preaching at Athens, quoted the last five words of this passage of Aratus:—

> "'For we are also His offspring,' as certain also of your own poets have said."

Galen admired the verses of Aratus on the phases of the moon and the consequences of her changes, and quotes sixteen lines of this poet of the age of Euclid, in the third book of his "De Diebus Decretoriis."

Aratus is said to have been read (I suppose in Latin) at Montpellier in the fourteenth century as part of the studies for a medical degree.

At the revival of learning and for some time after it he was an author proper for a physician to know, and there are several fine editions of the *Φαινόμενα* in the Library of the College of Physicians. The most ancient of these was printed by Aldus at Venice in 1499, and is included in a volume of astronomical tracts. The book once belonged to Thomas Bing, Public Orator at Cambridge, and Master of Clare from 1571 to 1598. The next most ancient of the copies of Aratus in the College of Physicians was printed at Basle in 1535, a Greek text with a translation into Latin verse. It belonged to John Ponet, whose signature is on the title-page. He was of Queen's College, Cambridge, and, as was fitting in a college where Erasmus once dwelt, was deep in Greek. He was also a good mathematician. In 1550 he became Bishop of Rochester and in 1551 of Winchester, and died abroad in 1556. Thus Bing, of Clare, and Ponet, of Queen's, must be added to the list of learned readers of Aratus.

To come to our own times. I asked a great Greek scholar of my own University if he had read much Aratus. "Oh," he said, "the weather man. No, not much." So that we may suppose that the reputation of Aratus as a poet has declined with his fame as a meteorologist, and that in the Universities, as at the College of Physicians, his works are but seldom taken from the shelf on which they rest in dignity as part of the learning of a past age.

What a curious example of the effect of the writings of a poet on men of far separated periods and nations is given by the line of Virgil which Harvey placed upon the manuscript of the lectures which contained the beginning of his exposition of his discovery of the circulation of the blood! The line was derived by Virgil from a Greek poet of the third century before Christ. St. Paul quoted the poet at Athens; Galen, writing in Greek, quoted him in Rome; Cicero translated him into Latin; and Ovid declared, in lines on the permanence of poetry, after praising Homer and Hesiod and Sophocles, "Cum Sole et Luna semper Aratus erit,"[1] meaning that the rising of the sun and the phases of the moon will always bring Aratus to our minds.

The influence of Aratus thus extends from the Greek world into the foundations of Christianity, into Latin literature, into the chief authority in medicine before the Renaissance, and through Virgil into the history of the discovery of the circulation of the blood.

The darkly stained little title-page of Harvey's lectures shows us at the top his favourite poet, and at the foot, in a passage from the Latin translation of the "Historia Animalium" (Lib. I, cap. 16), his most admired man of science, Aristotle. He quotes the philosopher in the lectures more often than any other ancient writer, and next most often refers to Galen. The first modern writer whom Harvey quotes[2] is Falloppius. In April, 1914, I found in the Library of the Royal College of Physicians the copy of this author which he had studied and which I show you. It contains several brief annotations in Harvey's handwriting, some of them signed with his joined initials WH, and others marked by the capital delta with which he was accustomed to indicate that he had himself observed a particular fact. The book is a folio, "Gabrielis Falloppii Mutinensis——Opera quae adhuc extant omnia ——Francofurti: Apud heredes Andreae Wecheli, 1584." The sides of the binding are original and are stamped with a beautiful central panel. On the two original fly-leaves at the beginning are notes of contents in a sixteenth-century hand, that of the first owner of the book. He has written his name on the title-page, "Sum Lanceloti Brunii." This was Dr. Lancelot Browne, a Fellow of Pembroke at Cambridge, who was elected a Fellow of the College of Physicians in the year that this edition of Falloppius was published.

Harvey married Browne's daughter, so that it is not wandering too far from the subject before us to give a few words to Browne.

He knew Arabic, and the College of Physicians possesses a manuscript which shows his writing in that language:—

> Specimen Arabici Dictionarii: hoc est: vocum Arabicarum collectio et interpretatio——Operâ et industriâ Gulielmi Bedwelli Cantabrigiensis Angli: A.D.N. M.D.I.V.C. Exscriptum per Lancelotum Brunium medicum Londinensem horis successivis spatio ferme trium mensium et finitum 11: Maii 1597.
> ”لازكاوط برون الطبيب

---

[1] "Amorum," Lib. I, xv, 16.

[2] Folio 3a.

The Arabic words are "Lancelot Brown el tebib" (the physician). The manuscript is written in a large volume, which has all its original binding, with a fine gilt panel on each side and seven gilt ornaments on the back. The leaves of a smaller manuscript, each of which is headed "Gulielmi Bedwelli: Specimen Arabici Dictionarii," are fastened into the book, and the large pages of the volume itself are ruled in double columns, in which Arabic words and their interpretations are written. Most of the words thus placed are taken from Avicenna, the first printed Arabic edition of whose Liber Canonis was published in Rome in 1593. William Bedwell, the author of the "Specimen," was born about 1561, became a scholar of Trinity College, Cambridge, and devoted a great part of his life to oriental studies. At his death in 1632 he bequeathed to his University a manuscript Arabic lexicon in nine volumes, as is related by Professor Robertson Smith. Browne's volume seems to be an exemplification of the contents of this work, which has never been printed.

Dr. Lancelot Browne's Arabic script is not as beautiful as that which I have seen his namesake and successor in oriental knowledge in the College of Physicians and at Pembroke write; but he had a fine Greek hand-writing, and the letters of his Latin words are always well formed—very different from those of his illustrious son-in-law.

How carefully he had studied anatomy is shown by his copy of Falloppius. The volume has 848 pages, not counting the index, and a very large number of these bear notes, corrections, or more elaborate remarks in Latin in his hand. These are not often very interesting, but show his close attention to the subject.

In the chapter on the therapeutic uses of roses Falloppius says that the rose causes sneezing and cold in the head in many, and that some even refuse to like the scent of roses. Browne has noted in the margin the names of three ladies, patients of his, in whom these effects were produced. Falloppius mentions that Nicolas Machesius, his preceptor, used to use spurge (euphorbia) in dropsy, and Browne has written *Hydrops* in the margin. He has drawn up several elaborate anatomical classifications, mostly taken from Vesalius, and in one place has shown a comparison between the classification of Vesalius and those of Ambrose Parè and of Courtin. He copies a note out of Vesalius as to calvaria discovered in graveyards in Styria and Carinthia.

He seems to have been well read in Vesalius, and constantly refers to him throughout the Anatomy. Numerous notes on the "Observationes Anatomicæ" of Falloppius occur, such as in reference to the muscles of the eyes, "Quintum par Fallopii pars Temporalium Vesalio Ex. 53."

One of Browne's notes refers to an autopsy he had himself made.

> In comitis Lincolinensis Ammirali magni dissecti arteriae magnae trunco iuxta lumbos in interna eius sede ossa quadam tenuia sed lata reperta pluria 1585 L.B.

These seem to have been large patches of atheroma in the lower part of the aorta.

This Earl of Lincoln was Lord High Admiral of England for more than thirty years. He was knighted after the storming of Edinburgh in 1544, and sailed thence to Boulogne and took part in its siege, and in 1550 was made Lord High Admiral, a post which, with a short interval in part of Queen Mary's reign, he held till his death in 1585. Browne very likely saw the Earl for the first time in 1564 when the University of Cambridge conferred upon him the degree of M.A.

While examining these very numerous notes and marks of Dr. Lancelot Browne I found on p. 91 the Δ and WH of Harvey appended to a remark of Falloppius that the gall-bladder is made as a sort of diverticulum. He meant to indicate that he had satisfied himself of this by dissection. Lower down on the page he has written *praeparatio* opposite the statement that Galen and Hippocrates both advise that the alimentary canal and the body be prepared before administration of emetics.

On p. 309 in the treatise on Metals he has written: "WH *simpliciter omnia concreta a magno calore liquantur.*" The remark interested him because Falloppius mentions a statement of Aristotle on the subject. Lower down on the page Harvey has written "*Naphta : ubi colligitur.*" Harvey's notes are generally his initials, his Δ, or a word or two. His initials occur about twelve times. His irregular heavy dashes under words of the text are easily distinguished.

By these marks we learn that Harvey had carefully perused the "De simplicibus medicamentis purgantibus," the "De metallis seu fossilibus," the "De ulceribus," and the "De tumoribus praeter naturam" of Falloppius. He has left no marks in the four treatises on Anatomy, but his lectures show that he had read them. Excluding mere dashes under words, Harvey has left something over eighty notes in this folio volume. It had been well read by Dr. Lancelot Browne before it came into his son-in-law's hands, and we can follow Harvey's study in its pages. Harvey gave it to the College of Physicians.

Sir Henry Halford, who presided over the College of Physicians from 1820 to 1844, remarked to Mr. Dawson Turner, the well-known botanist and antiquary of Norwich, that an inscription in the "Album Amicorum" of Philip de Clarges was the only autograph of Harvey which he had ever seen, and Mr. Dawson Turner has affixed a note in the album, which then belonged to him, to the effect that he had been unable to find any other writing of Harvey's. Mr. Dawson Turner died in 1858, and the album was bought by the British Museum at his sale on June 10, 1859.

Philip de Clarges, son of a Curator of the University of Leyden, was in 1636 a theological student there, and afterwards took to medicine. His coat of arms, drawn in the album, suggests that he was related to the Sir Thomas Clarges, after whom Clarges Street is called. Sir Thomas Clarges' sister married General Monck, afterwards Duke of Albemarle, the chief actor in the Restoration of Charles II. When Philip was in London, Thomas Clarges was practising as an apothecary. He afterwards sat in Parliament, and was created a baronet. On the first page of the album is the signature of Dr. James Primrose, with the date June 8, 1641. He had been examined by Harvey, then a Censor, in 1629, for admission to the licence of the College, and passed. He was a pupil of Riolan, and, like his teacher, did not accept Harvey's demonstration of the circulation, and wrote a treatise against it. Harvey's inscription is the fourth—"Dii laboribus omnia vendunt | Nobilissimo juveni medico Phillipo de Clarges amicitiae ergo libenter scripsi | Gul. Harveus | Anglus Med. Reg. et Anatomie professor: Londoni | May 8. A.D. 1641." | In the ninety-five years which have elapsed since Halford was first elected President, three other examples of Harvey's writing have been found in the British Museum. These are the autograph of his lecture notes of 1616, which the College of Physicians has published in facsimile; his lecture notes of 1627, described by Dr. George Paget in 1850; and the marginal notes on his copy of Dr. Goulston's edition of the "Opuscula of Galen," which I chanced to discover in 1888.

At Cambridge Dr. George Paget published, in 1849, an English letter of Harvey to Dr. Samuel Ward, Master of Sidney Sussex College, with a facsimile. In the Clerk's Office at St. Bartholomew's Hospital, a small page in Harvey's hand is framed. One Latin letter to Dr. Baldwin Hamey is preserved in the College of Physicians, where also his signature on the title-page of the small herbal of Fuchsius is to be found. All these I have examined. Dr. Aveling mentions a letter in the Bodleian.

The letter to Dr. Ward was at the time of its publication the only English letter of Harvey which had been published, but owing to the munificence of Sir Thomas Barlow, a fine collection of eleven English letters from Harvey to Lord Feilding has been added to the library of the College of Physicians. They belong to the year 1636, in which Harvey accompanied the Earl of Arundel to Vienna. The first two are from Linz in June, the third is from Baden, and these describe hunting, feasting, the state of the country, and some royal personages. The next six tell of the discomforts of Treviso, where he was detained in lazaretto till after August 26, 1636. The tenth is in September from Florence, and the last records his rejoining Lord Arundel.

Thus at the present day several examples of Harvey's handwriting are easily accessible, and familiarity with these may lead to the recovery, which Sir George Paget thought likely to occur, of more of his papers and notes of observations.

There is no motto on the title-page of the "Exercitatio anatomica de Motu cordis et sanguinis in animalibus" of 1628, but in the first chapter Harvey quotes "what the old man says in the Comedy," four lines from the Adelphi (v. 4, 1) of Terence. In reading these we must remember that Bentley's improvements in the metre had not then been made:—

> Nunquam quisquam ita bene subducta ratione advitam fuit,
> Quin res, aetas, usus aliquid apportet novi,
> Aliquid admoneat, ut illa quae te scire credas, nescias,
> Et quae tibi putaris prima in experiundo repudies.

Time and opportunity add to knowledge and correct error, show a man that he did not know what he thought he knew, and make him reject what he had once held of high value.

"Illud forsan in cordis motu eveniat nunc," says Harvey; and the lines are appropriate, though we might have expected Harvey in so important a place to have quoted some greater author—Aristotle, perhaps, or Plato. Dr. Francis Hare, in the dedication of his own edition of Terence to Lord Townshend, says that in his time Terence was neglected by grown-up men because it had been the custom at schools to make little boys learn bits of the Comedies from time to time in a way which prevented their enjoying them at all, and left their minds disgusted. This custom very likely went back as far as the school-days of Harvey. The lines he had learned at Canterbury remained in his head, and it is a sign of his total freedom from affectation that he quoted, in setting forth what he felt was a discovery for all time, a passage which his memory naturally supplied, and did not search about for some famous apophthegm or brilliant verse. It seems likely that boys were thus made to learn parts of the Comedies of Terence, with a view to familiarizing them with the phrases of the dialogues, and thus helping them to speak Latin as well as to read and write it.

Harvey's quotation does not exactly correspond with the then extant text of Robert Stephan's edition of 1541, so that he probably trusted entirely to his memory for the lines, and thus in the first and second lines made trifling mistakes.[1]

---

[1] STEPHANUS: Nunquam ita quisquam bene subducta ratione advitam fuit,
Quin res, aetas, usus semper aliquid ad portet novi,
Aliquid moneat, ut illa, quae te scire credas, nescias,
Et quae tibi putaris prima, in experiundo repudies.

In this first chapter he quotes a remark of Fracastorius, that the movement of the heart was only to be comprehended by God, so that besides the poem by which Fracastorius is now best known he had looked into the other works of that author. In the same chapter Harvey also mentions a quotation from Aristotle, made by Andreas Laurentius, that the movement of the heart was as hard to explain as the to-and-fro current of Euripus had seemed to Aristotle. Laurentius was the physician and anatomist whose lectures King Henry IV of France found so interesting that he attended them even during the Civil War, in which he had so much to lose.

Lastly, as if to give due honour to the professor before whom he kept his act for the degree of M.D. at Padua, Harvey mentions the writings of Hieronymus Fabricius of Aquapendente. Harvey speaks also of his own anatomical lectures, so that in this first chapter of his demonstration of his discovery we see him as a little boy learning to talk Latin at school; then at the splendid University of Padua, maintaining theses for his degree before Fabricius; then lecturing after the manner of the Academy of old before the College of Physicians. Fracastorius and Laurentius show his modern reading, and he does not fail to bring the venerated name of Aristotle into the chapter. He concludes this beginning of the great work of his life with a quotation from his boyish studies, showing that true simplicity which so often accompanies greatness of mind.

Harvey had not forgotten Fabricius of Aquapendente when he wrote his last book, for the first chapter of the "De Generatione" begins with his name and contains no other. The book is midway between his treatise on the circulation and his lecture notes. Though, like the former, it treats of a single subject, that subject is treated with a less severe conciseness, and approaches in character the scattered notes for lectures.

The "Exercitationes de generatione animalium" contains many passages which have an interest beyond that for which they were originally written. The account of his wife's parrot gives us a view of the interior of Harvey's home, and the description of the Bass Rock shows him in the open air, standing beneath a cloud of birds, listening to their loud cries, and picking his steps to avoid treading upon their eggs. Another passage tells of his demonstration of the movements of the heart to Charles I by making the king put his hand into the externally open, but internally closed, sac of an empyema in Hugh Montgomery, son of Lord Montgomery of the Ards, a young man who a few years later led a charge of cavalry in the second battle of Benburb. At the end of the chapter "de Partu," Harvey relates an incident in the wars of Ireland which had been told to him by Sir George Carew, Earl of Totnes, and sometime President of Munster:—

"I will only add in conclusion a memorable example told me by the most illustrious Sir George Carew, Earl of Totnes and long President of Munster in Ireland, who also wrote the annals of those times. There was a woman with child who followed her husband, a soldier of the expedition. When the army marched daily to fresh places, by chance being checked by coming to a little river, it halted for an hour. At that very time this pregnant woman was taken in labour, retired to the nearest patch of drifted trees and brambles, and alone without the aid of any midwife or other help, brought forth two boys which she carried to the river and there washed them and herself in the running water, which done, she wrapped the twins in a rough cloth and carried them upon her back, and that very day marched with the army for twelve miles barefooted as she was, and without any injury to her health. The next day the most illustrious Lord Deputy Lord Mountjoy (who at that time was leading the army to the siege of Kinsale against the Spaniards) and the President of Munster, who told me the story, moved by the strangeness of the event, became godfathers to the babes and were pleased to give them their own names."

George Carew was educated at Oxford at Pembroke College, then called Broadgates Hall. At the age of 20, in 1575, Carew began his career as a soldier under Sir Henry Sidney in Ireland, where warfare and politics occupied him for some twenty-six years. The Carew papers, of which there are a great many volumes at Lambeth, as well as many other documents in the Bodleian, and in the British Museum, and in the English and Irish State paper offices, show how much work Carew got through in the field, at the Council Board, and in his own study. He was a student of military affairs as well as a skilful commander, and four of his volumes (containing six treatises) in the College of Physicians' library belong to this branch of reading. The two earliest were published while he was at Oxford, the "Discorsi di Fortificationi" of Carlo Theti, a Neapolitan, printed at Rome in 1569, and the "Disciplina Militare" of Sir Aurelio Cicuta, printed at Venice in 1572. These were bound in vellum tied with green strings, and with Carew's arms (three lioncels passant) on the side, some time after 1598, the date of a third treatise in the volume "Instruttione di Artiglieri," by Eugenio Gentilini, printed at Venice in the form of a dialogue between Eugenio and his brother Marino. Another of our volumes bound in the same way, the "Discorsi di Guerra" of Bernardino Rocca, was published at Venice in 1582, the year that Carew became Gentleman-Pensioner to Queen Elizabeth. This has Carew's and a more illustrious name written on the title-page. A finely printed folio bound in dark brown leather, also with strings, and with Carew's arms on the sides, is the "Delle Fortificatione" of Buonaiuto Lorini, printed at Venice in 1597. Carew has written his name on the title-page and the date, showing that he bought the book in the year of its publication. It was a year in which he varied his Irish experiences by serving in an expedition to the Azores. Another folio, bound in vellum with strings, and with his arms, is the "Corona e Palma Militare di Arteglieria" of Captain Alessandro Capo Bianco, printed at Venice in 1598, a year in which Carew went to France on an embassy with Sir Robert Cecil. All these books are in Italian. One other is an Italian-English dictionary with a grammar, "Queen Anna's New World of Words or Dictionarie of the Italian and English Tongues," by John Florio, printed at London in 1611. It is bound in vellum, with Carew's arms, but, as befits a work of constant reference, without strings.

Carew left Ireland in 1603. He was made Vice-Chamberlain to Queen Anna, and no doubt knew John Florio, who taught her Italian and was "one of the gentlemen of her Royall Privie Chamber." The book is very clean, and seems to have been bought by Carew rather because he knew Italian and cared for the language than that he needed a dictionary for his reading. He had, perhaps, learned Italian from John Florio, who lived and taught at Oxford while Carew was an undergraduate, and was only about two years his senior. These seven works show Carew's professional studies and the knowledge of Italian which enabled him to pursue them.

He was a man of letters as well as a soldier, and knew Sir Thomas Bodley and Sir Robert Cotton, those great founders of libraries, and Camden, the historian. In one of these books is a memorial of a more intimate friend and a greater man than these learned persons. On the title-page of Rocca's "Considerations on War" is written *Walter Ralegh*, and at foot, also in Ralegh's clear hand, *Medium Mediis*. The two owners of this book had been friends for thirty years in 1618, when Carew tried in vain to persuade James I not to carry out the old sentence upon Ralegh.

Carew married in 1580 Ann, daughter of William Clopton, of Clopton House, in Warwickshire, where his portrait is still to be seen. Everyone who has read the history of these islands knows what he was like from the frontispiece of "Pacata Hibernia," that curious book, based upon Carew's papers, which at first seems intolerably dull and, as it is studied, gradually yields to the mind passages which cannot be forgotten. Carew was made Earl of Totnes in February, 1626, and died on March 27, 1629. He had an attack of paralysis at the funeral of James I in 1625, but it did not disable him from taking part afterwards in business in the House of Lords. Since Harvey speaks of him as Earl of Totnes it seems fair to conjecture that the Earl told him the story related in the "De generatio animalium," while the discoverer of the circulation of the blood was endeavouring to improve Carew's enfeebled condition in the last three years of his life. It is pleasant to figure Harvey visiting the accomplished old soldier at his London house in the Savoy and listening to the story of the poor woman's march with the army, and of the birth of the twins who became the godsons of Mountjoy and of Totnes.

(*November* 17, 1915.)

Note on an Autograph Letter describing Inoculation of Small-pox in Carlisle in 1755.

By HENRY BARNES, M.D.

DR. JAMES DOUGLAS was a physician in Carlisle about the middle of the eighteenth century. From his will, a copy of which is in the Carlisle Probate Court, it appears that it was proved in Edinburgh, and then apparently administration was granted in Carlisle. The contract of marriage between himself and Mary Maxwell, his spouse, and Dame Helen Erskine, his mother, bears date the twentieth and twenty-second days of October, 1730. The Parish Registers of St. Mary's Church, Carlisle, record between this date and 1755 the birth of nine children, and his burial is recorded under date May 5, 1755. The following letter, dated January 29, 1755, shows him to have been a careful physician, and is of interest as showing the extent of the practice of inoculation in a provincial city, the dangers which might be apprehended, the precautions to be adopted, and the method of performing the operation :—

Dr. Sr.,

Being from Home I had not an opportunity of answering yours sooner. From what you write of Miss Fleming I see no objection that needs frighten Mrs. Fleming from inoculating Miss against the Approaching Season, it being the most favourable time of the whole year. In a subject so Healthy as you describe the young lady to be, I have found from many trials that it is best to use no preparation other than a cool spare Diet (unless they sink under it) if of a Sanguine, Florid Complexion, Bleed once, and purge once, or twice, with Rhubarb, Manna, and Salts. About three or four days before they sicken, or six days after the inoculation is performed, when I give a moderate dose of Tincture of Rhubarb and Manna, purely to cleange the primæ viæ. It is sufficient to perform the Inoculation in one part only, but I alwise chuse to make the Incision so deep as to pierce the Skin quite thro' to the Membrana Adiposa, allowing the Incision to bleed for a few minutes, then the running of the Blood may not wash away the infected matter. The Disease from inoculation I have always treated precisely in the same manner as natural Smallpox of the same kind and degree. And therefore I need not trouble you with a Detail of what you know so well, but shall only suggest to you a few general

Observations that have occurred in the course of Practise, which perhaps may give some satisfaction to the Relations of our Patient, who I hope will have the same good fortune with the numbers that have undergone that operation in this Town and Neighbourhood, which are near four hundred, without loss, or in the least marked.

1. The Eruptive Fever in Inoculated Smallpox is seldom so high as to require Blooding, tho' in some rare cases it does.

2. One ought to expect that every bad symptom of the natural kind may happen after Inoculation, but experience shows that they very seldom do. For instance, in one case only I have hitherto seen Epileptic Fits (and not without danger) attend the Eruption, which could not be overcome without both Blooding, Blistering, Internal Antispasmodies and Pediluvia. These happily at last prevented danger and carry'd off the Fits.

3. In the inoculated kind, where they were numerous and the matter thin, I have known it necessary to give the Decoction or Extract of the Bark from the fourth day to the height.

4. When the Defluction in the Throat thickens, emollient Pectorals, and even Squill Mixture are sometimes necessary.

5. I have never yet seen in the Inoculated kind either bloody stools, Bloody Urine, but should make no hesitation, if I met with them, to continue the use of the Bark and join to it the Spirit of vitriol in the common manner.

Our Patient Mr. Pattinson Dy'd a fortnight ago, without any remarkable alteration of Symptoms, save that of a looseness, which invaded him a few days before he Died, as also a large Discharge of Matter, which he spit up in great abundance for three or four days, very crude and fœtid.

My wife joins me in our best wishes to you and Mrs. Carlyle, And believe me to be with great esteem,

Dr. Sr.,
Your Most Obednt. Humble Servt.
Carlisle, 29th Jan. 1755. JAS. DOUGLAS.

(*November* 17, 1915.)

On Anthony Askew, M.D., F.R.S., and his Library.

By HENRY BARNES, M.D.

IN the Bibliotheca Jacksoniana at Carlisle, a library containing books, prints, MSS., &c., relating to, or in some way connected with Cumberland, Westmorland, and Lancashire north of the Sands, we have several volumes in which mention is made of Anthony Askew, M.D., F.R.S., one of the most famous of the bibliophiles of the eighteenth century. Askew was born at Kendal, and the following is the extract from the Kendal Parish Registers relating to his birth:—

> 1722, March 7. Antho. son of Dr. Adam Askew and Ann his wife of Market Place bapt.

Adam Askew, the father, was a celebrated physician at Newcastle-upon-Tyne, and known as the Radcliffe of the North. The mother was a member of an old Westmorland county family, the Crackanthorps, of Newbiggen Hall, and this probably accounts for their eldest son being born at Kendal.

Young Askew received the first part of his education at Newcastle, under the celebrated Richard Dawes, then went to Sedbergh School, and afterwards to Emmanuel College, Cambridge, where he took his B.A. degree in 1745, and was elected a Fellow of his College in the same year. He continued in residence until he took his M.B. degree, and then proceeded to Leyden, where he remained twelve months. Soon after we find him in the suite of the English Ambassador at Constantinople. In January, 1748, he was in quarantine at Malta, and in 1749 he returned to England by way of Italy and Paris, where we are told he bought several rare MSS., early editions of the classics, and valuable books in various branches of science, thus laying the foundation of the elegant and extensive library which afterwards became so famous. On his return to England, he proceeded at once to Cambridge and took his M.D. degree in 1750. He then settled in London, taking up his residence in Queen Square, was admitted F.R.S. in February, 1749, F.R.C.P. in 1753, and Physician to St. Bartholomew's Hospital in 1754. Soon after settling in London, he got into a good and extensive practice, which accumulated upon him as long as he lived. According to Dibdin, "Dr. Mead supported him with a sort of parental zeal, nor did he find in him an ungrateful son. Few minds were probably more congenial than those of Mead and Askew. The former had so to speak a magnificence of sentiment which infused into the latter just notions of a character aiming at solid intellectual fame, without the petty acts and dirty tricks which we now see, too frequently found to obtain it."[1] His professional work did not prevent his devoting a good deal of time to literary pursuits. He never published any medical work, but while at Leyden, in 1746, he published a small quarto pamphlet, a specimen of the Tragedies of Æschylus, dedicated to his friend Dr. Mead. His great delight was in his library, and as a collector of books he brought bibliomania into fashion. He collected rare MSS. and the choicest editions of the classic authors. Of several he possessed every edition, especially of the Greek authors. His house in Queen Square was crammed full of books, the passages were full, even the garrets overflowed, and the wags of the day used to say that half the Square itself would have done so before the book appetite of Dr. Askew would have been satisfied. In that delightfully fascinating volume "The Gold Headed Cane," in which the author gives an account of its successive owners—Radcliffe, Mead, Askew, Pitcairn and Baillie—reference is made to the many literary men and great scholars who were frequent visitors to Dr. Askew's house, "attracted as well by the abundant luxuries with which his table was furnished, as by his classical conversation and learned accounts of curiosities which he had brought with him from his interesting travels in Greece and the East." By such distinguished persons as Dr. Markham, afterwards Archbishop of York, Sir William Jones, Dr. Farmer, Demosthenes Taylor and Dr. Parr, Askew was considered as a scholar of refined taste, sound knowledge and indefatigable research into anything connected with Grecian and Roman learning, and his library was full of rare editions which he had great delight in exhibiting to his friends.

Dr. Askew died on February 27, 1774, aged 52, and his library was sold in 1775, the sale lasting twenty days. We are fortunate in possessing in the Bibliotheca Jacksoniana a sale catalogue of this library. On the page immediately after the title-page I find the following MS. notes:—

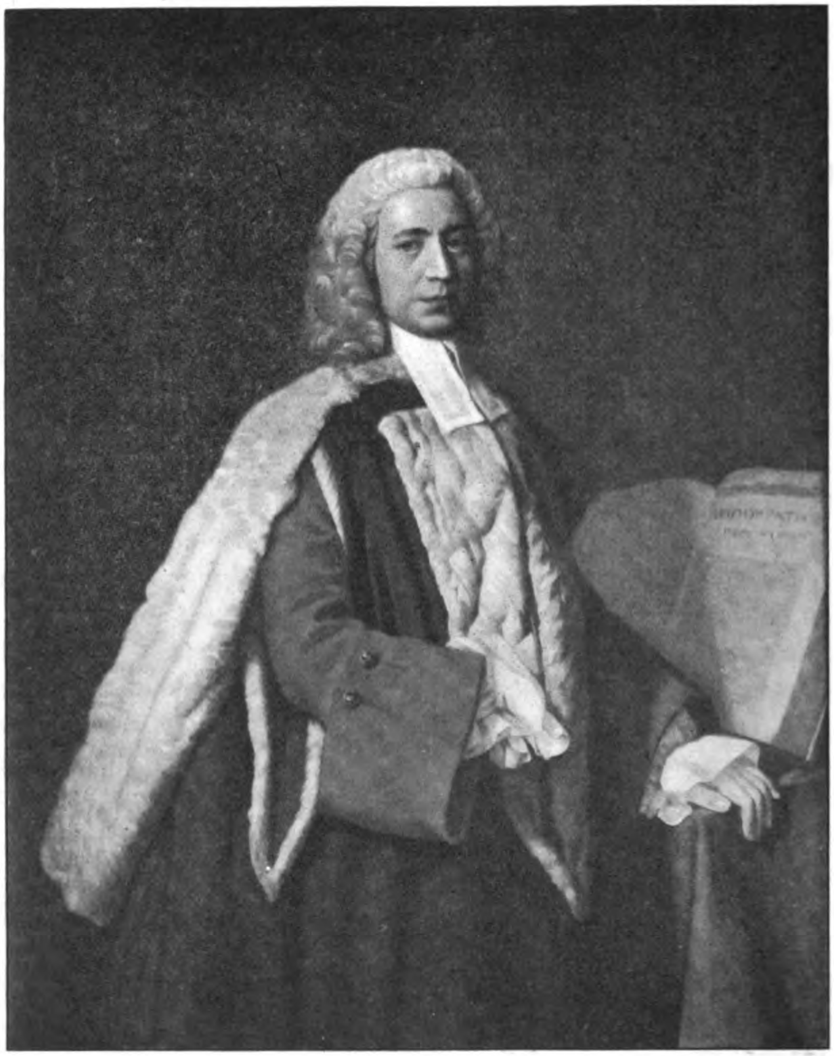
"The whole library amounted to £4,090 : 10 : exclusive of two marbles which were purchased by Mr. Brown, a gentleman of fortune in Surrey, who has a capital collection. The books sold above the valuation. The purchasers of those marked are—

---

[1] Dibdin's "Bibliomania," p. 515.

> His Majesty George III bought £300.
> British Museum Do.
> M. De Bure, a French bookseller, £500.
> N.B. He had commissions for £1,500.
> Dr. Hunter, Physician to His Majesty, £500.
>
> 13 April 1775. From the authority of my friend Richard Gough, Esq., who attended the sale, marked his catalogue and compared it with the Clerk's sale one.

There are two points in connexion with this catalogue to which I should like to call attention. The first has puzzled me ever since I became acquainted with it, and I mention it now in the hope that some member may be able to throw some light upon it. Sir Walter Scott, in the third chapter of his well-known novel "The Antiquary," makes Mr. Oldbuck tell his favourite story of Snuffy Davie and Caxton's "Game of Chess" when speaking of the pleasure in the personal labour of forming his library and saving his purse at the expense of his time and toil: "'Davy Wilson,' he said, 'commonly called "Snuffy Davie," from his inveterate addiction to black rappee, was the very prince of scouts for searching blind alleys, cellars and stalls for rare volumes. He had the scent of a slow hound, sir, and the snap of a bull-dog. He would detect you an old black-letter ballad among the leaves of a law paper, and find an *Editio princeps* under the mask of a school Corderius. Snuffy Davy bought the "Game of Chess," 1474, the first book ever printed in England, from a stall in Holland, for about two groschen, or two pence of our money. He sold it to Osborne for twenty pounds, and as many books as came to twenty pounds more. Osborne sold this inimitable windfall to Dr. Askew for sixty guineas. At Dr. Askew's sale,' continued the old gentleman, kindling as he spoke, 'this inestimable treasure blazed forth in its full value and was purchased by royalty itself for one hundred and seventy pounds! Could a copy now occur, Lord only knows,' he ejaculated with a deep sigh and lifted-up hands, 'Lord only knows what would be its ransom; and yet it was originally secured by skill and research for the easy equivalent of two pence sterling.'" In a footnote the author says that this anecdote is literally true and David Wilson was a real personage. Scott was a careful recorder of facts and a keen bibliophile, but this catalogue offers no confirmation of the story. The "Book of Chess" is not in the catalogue. The only book of Caxton's in the catalogue is lot 172, "Cicero on Old Age and Friendship," published in 1481. It sold for £13 13s. Nor is there any lot which fetched £170. Lots 684 and 685 were sold together. They were folio volumes bound in morocco with gilt edges and published in Ferrari in 1475. They were the "Il Teseide" and the "Il Forze de Hercole," of Boccaccio, and were purchased for the King at the sum of £85, being the top price of the sale. The two lots next in value were lot 1,576, an editio princeps



Anthony Askew, M.D., F.R.S.

entitled "Durandi Rationale divinorum Officiorum," bought for the British Museum for £61, and lot 2,656, "Platonis opera, Graece," 2 vols., Ven. ap. Ald., 1513, which fetched £55 13s. How Scott got hold of his story I am quite unable to say.

The second point in the catalogue which has interested me is the small number of medical books in the library of a physician of such eminence. On some of the days of the sale there were only two or three medical books offered for sale, and altogether the number of medical books would not amount to more than 150 volumes, of which the most valuable were some of the editions of Hippocrates and Galen.

Through the courtesy of the Fellows of Emmanuel College, Cambridge, I am able to show you two photographs of Dr. Askew, taken from an oil painting in the College by one of their number, Dr. T. Shirley Hele.

DR. LEONARD GUTHRIE exhibited a catalogue of the library of Dr. Richard Mead, sold by auction by Samuel Baker in 1754-55, and priced throughout. It was David Garrick's copy and contained his book-plate.

(*November* 17, 1915.)

An Account of a Remarkable Sacred Potion Bowl from Tahiti.

By B. GLANVILL CORNEY, I.S.O.

THE study of curative methods in vogue with primitive races is always difficult, because of the firm and abstruse belief in supernatural pathology and treatment which prevails among such people. In Tahiti disease was attributed to the will of offended deities or the malevolent influence of the shades of deified ancestors. The medicine men there were the Tahua, or sacerdotal soothsayers, whose function was not only to conduct religious rites and worship in the Marae (which were sacred enclosures), but to minister to the welfare of the bodies of their clients, as well as to the destinies of their souls. The remarkable bowl, of which a photographic slide was exhibited on the screen, used to be kept in the important Marae called Taputapuatea, situated in the district of Punaauia, towards the western side of the island. It is formed of fine-grained, hard, black dolerite, and is skilfully carved out of a single block of the stone, which comes from a quarry in the island of Maurua, some 160 miles farther to the westward. It is scaphoid in form, and stands on four short legs or supports, which are part and parcel of the same block. The bowl measures 3 ft. 10 in. in length, 1 ft. 10¼ in. in its greatest width, and stands (including the feet) 11 in. in height. The concavity is 4 in. deep, and polished; the bottom is 3 in. thick at the most. The more pointed extremity terminates in a groove or lip; the broad end exhibits three little transverse beadings on its rim, which are the only semblance of ornamentation it has in any part. The model on which it has been designed is the Polynesian bottle-gourd (*Lagenaria vulgaris*), and the lip of the bowl represents its junction with the stalk. The weight of the bowl is such that the united effort of two men only just suffices to raise it a few inches.

Native authorities agree that it was formerly used for the trituration and infusion of herbal remedies which were to be consecrated in the Marae before administration to a patient, and that the drug would have been thought to derive greater efficacy by such preparation, in which the Tahua played the part of physician, priest and pharmacist. Mr. J. Lyle Young, of Tahiti and Auckland, thinks, however, that it may have been used for the reception of sacrificial pigs' entrails, designed as an augury and precursor to important events, such as a coming war or the grave illness of a high chief; and his opinion claims full consideration.

The history of this bowl is interesting. It was delivered over in 1775 by Tu, the Supreme Chief of Tahiti, to a young Spaniard named Máximo Rodriguez, who was a marine serving in the frigate *Águila*. It was conveyed to Lima, mislaid there for twelve years, and then sent home to the King of Spain in 1788; after that it again passed out of knowledge until 1912; when the reader of the paper, who had previously exhumed its documentary history from 1775 to 1788, had the good fortune to meet with and identify the bowl itself in Madrid, perfectly preserved, but unknown and unheeded. It is now exhibited in the *Sección etnológica* of the *Museo Nacional* in that city.

(*November* 17, 1915.)

Thirteenth Century Miniatures illustrating Medical Practice.

By CHARLES SINGER, M.D.

THE figures here described are contained in a manuscript in the Bodleian Library, numbered Ashmole 399. This volume contains a series of medical writings and drawings, nearly all of considerable interest. The pictures with which we are specially concerned occupy both sides of folios 33 and 34, and their character, execution, colouring, and association all suggest the same hand. Each page contains two miniatures, the pairs being always related to each other, the lower member continuing the story of the upper. There seems to be only a general relationship between the groups. The figures are, unfortunately, without letterpress. In those reproduced on Plates 3 and 4 the artist has inserted some scrollwork intended to contain legends which were never written. The scenes are, however, very dramatically composed and tell their own story.

The colours of the original are weak and watery and do scant justice to the free drawing. The costume and draughtsmanship make us fairly confident in attributing these pictures to the thirteenth or early fourteenth century. It is less easy to suggest their place of origin. They do not resemble Italian or Flemish products of the period. The present writer inclines to the belief that they are of English or German workmanship, with a bias in favour of the former.

PLATE I, UPPER SECTION.

A deathbed scene. The patient lies on a bed, her head propped up on a pillow. Five other figures are represented, three at the side of the bed and two at the foot. Beginning from the extreme left we have :—

(*a*) A tonsured monk, who supports

(*b*) A physician, wearing the usual professional robe and cap. Having performed a urinoscopy, which has provided a very unfavourable prognosis, he lets fall the urine glass in his alarm and stands warning those in front of him. First among these is

(*c*) A female figure. Her sex is betrayed by her head-dress. She stands with clasped hands imploring aid, and is supported by

(*d*) A tonsured monk.

(*e*) The fifth figure, possibly also a monk, turns towards the dying patient, perhaps to administer Extreme Unction.

PLATE I, LOWER SECTION.

This picture is of very great interest, and is probably the earliest yet brought to light representing the actual process of dissection. Illustrations dating from before the fifteenth century that depict this operation are very rare. Beside that before us we know of only two. They are:—

(*a*) A series of figures of the thirteenth century reproduced by E. Wickersheimer in the *Archiv für Geschichte der Medizin* of 1914. The volume is now inaccessible and we are unable to give the exact reference. Only the figure of the dissector is shown besides that of the corpse. The series illustrates different stages in the process of dissection.

(*b*) A post-mortem scene of the fourteenth century in a Guy de Chauliac MS. at Montpellier, MS. 184 français, folio 14 recto. This picture is somewhat damaged. It is badly reproduced in the admirable monograph on Guy de Chauliac by E. Nicaise, who describes it—erroneously, as it appears to us—as "Une leçon d'anatomie." It represents a scene in a death-chamber where the friends of the deceased remain, some of them praying, while the medical attendants conduct a post-mortem examination.

(*c*) A third picture which Nicaise interprets as an anatomical scene is found in a Provençal translation of Guy de Chauliac, deposited in the Vatican Library. This exquisite miniature, enclosed in an initial, shows two figures, perhaps professor and pupil, contemplating or inspecting, but certainly not dissecting, a wasted corpse. It has not been reproduced.

Our figure on Plate I, lower section, shows a female corpse opened from xiphisternum to symphysis pubis. The body has been eviscerated, and within it can be seen the line of the vertebral column, while the organs lie around. Above can be distinguished the kidneys and perhaps the intestines, below are the heart and perhaps the stomach. At the foot of the cadaver stands the dissector with a knife in his left hand and the liver in his right. He wears a cap, and his dress has been girded up. His countenance exhibits alarm and surprise as he is interrupted in his nefarious task by a physician and a monk. The physician wears the cap and robe of his profession, and touches the dissector with a warning finger, while he upbraids him with raised hand. The monk behind wears his cowl. Both look reproachfully at the criminal, who is, perhaps, some low surgeon.

This picture, presenting the dissector in an unfavourable light, is, so far as we know, quite unique in the earlier history of the subject. It is the more remarkable in that the series of which it is a member was evidently intended to illustrate a medical work. It gives us a glimpse of a period when dissection, though already practised, was yet reprobated by some classes of medical men.

PLATE II, UPPER SECTION.

Here we have a consultation represented. All the patients are women. The physician in cap and gown sits in his chair. To him enter a series of patients. The first wears a long veil which she has raised, and she points with her right hand to her forehead, while in her left she carries a vessel containing, presumably, a drug, to which the doctor points with his right hand. He is advising her how to apply it. The second waits her turn, and is apparently suffering from some injury or disease of the right eye, to which she points, and which is differently represented to the left. The third carries a urine bottle in her hand. and is engaged with the fourth lady, who is apparently vomiting. Finally comes a male figure, who gleefully clasps a purse. He is, perhaps, the doctor's assistant, whose function it is to collect the fees.

PLATE II, LOWER SECTION.

This picture is less easy to interpret. The mounted figure is the physician, who is dressed as before. Behind him stand five female figures and before him a male bearing a hawk (or a dove). He has perhaps paid his visit and is now leaving. He holds up an admonitory finger, while the male figure who does the same is maybe urging his good lady to obey the doctor's orders.

PLATE III, UPPER SECTION.

The patient, again a woman, is in a swoon or trance, and has evidently been taken for dead. She lies on the bed, her head propped up on a pillow, candles by her side, and a bowl of holy water on her bosom. The bed covering is shown flung aside. By her head stand the attendants in an imploring attitude, begging the physician's aid. Two of these attendants are distinctly delineated. The one in front is tonsured, while the figure behind wears the head-dress sometimes affected by surgeons of the period (*see* text figs. *a* and *b*). In front of the bed kneels a child, who, with clasped hands, also implores the physician for help.

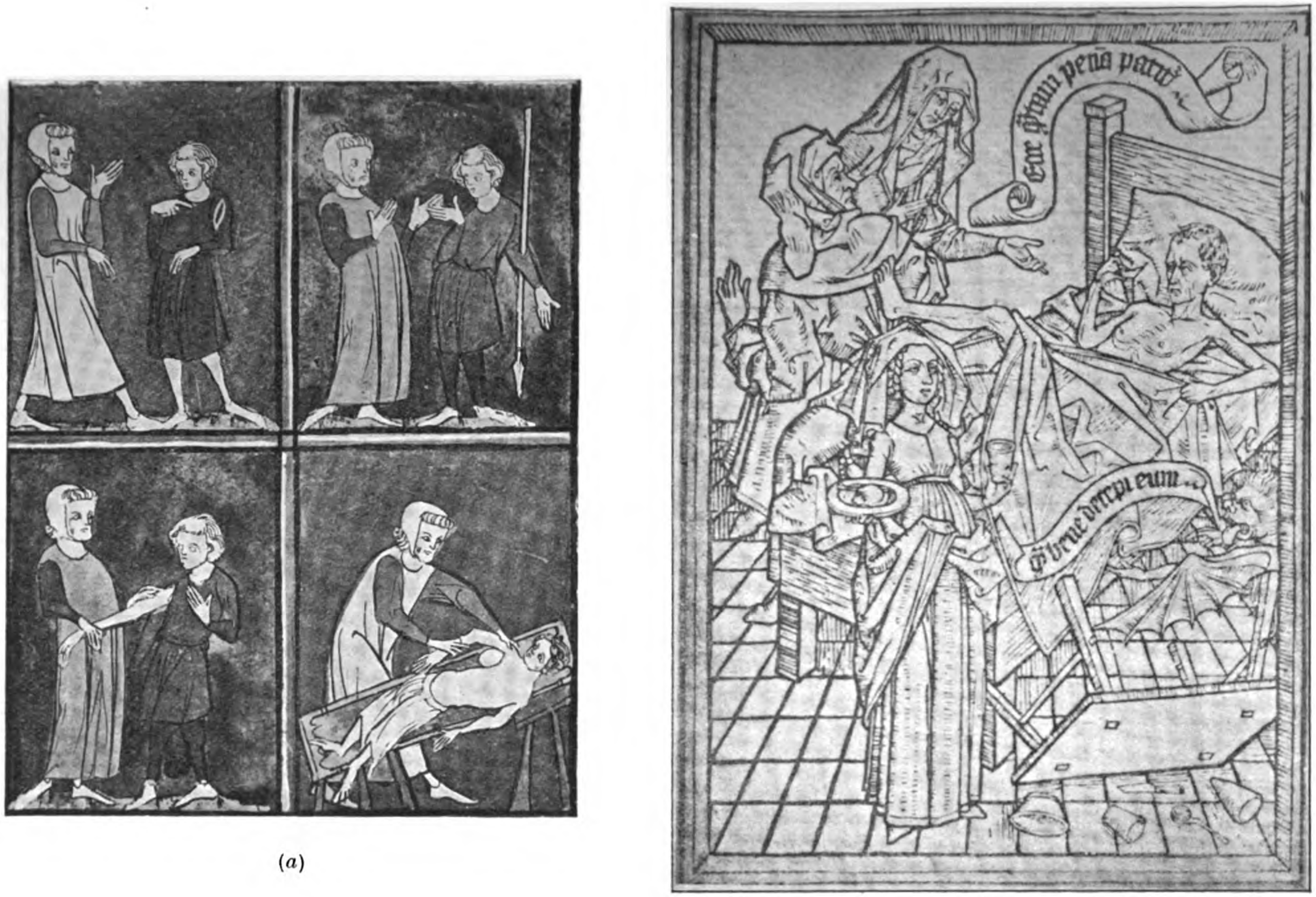
At the foot of the bed is a group of six figures, of whom three can be clearly distinguished. Of these the first is the physician, garbed as before. With his right hand he seizes that of the patient, perhaps to feel the pulse. From his left proceeds an uninscribed roll. Behind the physician is a figure we would regard as male, and probably a surgeon. Behind him comes a third male figure.

PLATE III, LOWER SECTION.

Here the patient of the last picture has partially recovered, and a female attendant holds some object to her nose. This object is probably a pin rolled in wool and steeped in aromatic substance—a common prescription at the date of the MS. Between the figures a book has been allowed to fall. Behind the patient is the child of the last picture, who has by no means recovered all his or her equanimity. Beyond stands the worthy physician clothed as before, and with a scroll proceeding from his hand. Behind him is a male figure.

PLATE IV, UPPER SECTION.

Again a female patient is swooning. She is supported on either side by a female figure. We are unable fully to interpret the dog or other little animal represented below her, but would remind the reader that the application of some creature still living, or recently killed in horribly cruel fashion, was a frequently applied therapeutic measure among those who practised gynæcology in the thirteenth and fourteenth centuries. To the right of the picture stand the physician and a monk.



(a)

(b)

Figures to illustrate the mediæval surgeon's head-dress: (a) From a fourteenth century French MS. of the Surgery of Roger of Salerno (British Museum, Sloane 1,977, folio 5, recto). The surgeon in all four groups is shown with his characteristic head-dress fastened under the chin and with the flap turned up as in Plate III, upper section. He is, in each case, interviewing a patient. (b) From a Latin block book on "The Art of Dying," printed in the Netherlands about 1460. It shows a patient who, aggravated beyond endurance by long illness, kicks the surgeon, spurns the nurse, and upsets the table of invalid food. At the same time he summons a serving damsel who brings a more substantial meal. The ill-used practitioner has let fall the lappet of his cap, which, however, is fastened under his chin as before. The upper legend contains the patient's words, "Cur quantam penam patui?" ("Why have I suffered such pain?"), while from the corner the Devil answers, "Quia bene eum decepi" ("Because I have thoroughly deceived him").

PLATE IV, LOWER SECTION.

The same group is represented as in the upper section. The patient's head-dress has now been removed and restoratives are being applied. The processes here depicted were favourite therapeutic measures in the thirteenth and fourteenth centuries, and are recounted in numerous contemporary treatises on the diseases of women (*see* Appendix A).

The attendant on the extreme left of the picture is placing to the patient's nose a burnt feather steeped in the vinegar or water contained in the bowl in her left hand. The attendant in the forefront of the picture is preparing a fire for the purpose of suffumigating the patient with some aromatic substance. Physician and monk stand by as before.

What manner of work were these miniatures intended to illustrate? The pictures have the following characteristics:—

(*a*) The patient is always a woman.

(*b*) The remedies suggest those for peculiarly female ailments.

(*c*) The physician is always represented as in alliance with clerics.

(*d*) There is a reprobation of dissection.

We may infer that the work for which these drawings were destined was one of that very numerous group that usually received the title "De passionibus mulierum" or "De secretis mulierum." This view is confirmed by examining some of the other items in the volume from which our plates are taken. Among these items are the following, all in thirteenth century hands:—

(*a*) Numerous prescriptions for various gynæcological conditions scattered throughout the volume.

(*b*) "Tractatus obstetricus de forma uteri et fetus in eo positionibus diversis. Etiam de fetus formatione" (folios 14 r. to 15 r.). The valuable figures illustrating this short treatise have been reproduced by K. Sudhoff in the *Archiv für Geschichte der Medizin*, 1911, Plate II.

(*c*) The remarkable diagram of the structure of the uterus and adnexa, which we reproduce in a subsequent article (folio 13 v.).

(*d*) A description of the anatomy of the uterus taken from Constantine the African (folios 15 r. to 16 v.).

(*e*) "Constantini liber de coitu . . . incipiens ita. Creator nolens animalium genus firmiter ac stabiliter permanere" (folios 18 to 21).

(*f*) "Liber de aegritudine mulierum . . . e Galeni Hippocraticis et Constantini libris . . . confectus (folios 21 to 26).

(*g*) "Scriptuncula de formatione fetus" (folios 26 to 27).

(*h*), (*i*) Two gynæcological fragments on folios 26 and 27.

Assuming, then, that the figures were to illustrate a gynæcological MS., for whom and by whom was this document prepared? We suggest that it is the handiwork of a resident in a monastery, and was not improbably intended for a monastic practitioner. The suggestion of a cleric engaged in practice of this kind will not be very surprising to those who have perused some of the mediæval gynæcological literature. Of course, some monasteries were by rule cut off from all intercourse with women. Nevertheless, it is not unusual to encounter a gynæcological prescription emanating from some eminent cleric. An example of this happens to lie before us at the moment in a late fourteenth century compilation (British Museum MS., Sloane 2,463, folio 200 verso): "This medecyne taught the Pryor of Bermondsey to a woman that was nygh dede on the fluxe of hyrre marice [matrix, womb]. To amend hyrre stomak he lete take two handful of the medell rynde of the brome and lete sethe hyt in thre potell of clere water to a potell; clense hit and putt therto half a pint of whyt suger and lete sethe eftsones and gef hyr to drynke."

It is to be remembered that those in Orders were discouraged or forbidden by the Church from the practice of surgery, involving as it did the shedding of blood. In the practice of medicine the cleric had to compete with the experienced lay physician. There remained, however, the special group of the diseases of women, which were then treated as symptoms, with hardly ever any local examination. Women would, perhaps, be less disinclined to discuss their condition with clerics than with laymen, while moral influence would often be more helpful than medical skill. The most widely read mediæval treatises on the subject were attributed respectively to Constantine Africanus and to Albertus Magnus—both clerics.

A considerable mass of mediæval vernacular gynæcological literature lies scattered among our larger libraries. For whom was it intended? Clearly not for the physician, whose professional literature was always in Latin. It is quite unlikely that it was intended for the surgeon, for it seldom or never advises operative procedure, but relies on such treatment as drugs, baths, and stuphes. Nor was it in the main intended for the apothecary, for homely remedies are for the most part employed, while the pathological theory with which these works are full would be superfluous to him. Nor could the barber have been a student of works which seldom advise blood-letting. We suggest rather that this literature was intended for the women themselves, who would invoke the monastic practitioner with or without the aid of the physician in the more severe cases. A research into this accessible and easily interpreted material should yield interesting results.

We terminate our article by three extracts from this literature. The first illustrates well the type of treatment depicted in our plates. Indeed, it might have been written to illustrate Plate IV, Lower Section. The remaining two extracts are the introductions to two early English gynæcological works, which will give the reader an idea of the tone and method of these compilations.

Appendix A.—From a fourteenth century MS. in the Bodleian Library, MS. Douce 37, Western 21,611. Very similar to this are two British Museum MSS., Sloane 421 (a), folio 2, in a sixteenth century hand, and Additional 34,111 (xi), folio 197, in a fifteenth century hand.

> [folio 5 v.] Suffocacyon of matrice is when þe matrice rysyth out of hys ryght plase and goyth aurhy [awry] & þe cause þer of I schall schew yow . . . [folio 6 r.] Because þat all þe breth þat we draw commyth by contynnall clappinge of þe longs and when þe matrice takyth þe longs hit pressyth hem and comburth [cumbereth] hem þat þey may not meve ne [nor] clappe for to draw brethe and when þe breth may not come in ne out þe body ys as dede and þat ys cause þat women oþerwhyll [sometimes] by [be] asyounyng [a-swooning] as þey were dede. . . . [folio 20 r.] And þe suffocacyon makyth þe matryce to arise to þe hert & har pulse ys styll . . . and makyth her to swonne [swoon] and makyth her also to courbe [curve] togedyr her hede and har kneys. Whan þeys [these] thyngs fall to a woman . . . tak a fethyr [feather] & wet hit in hott water and wete well her face þer with and makyth hote your hondys [hands] and . . . meve [move] ofte her chynne and putte to har nosse thyngys of strong savor. . . . And be nethe [folio 20 v.] at her wyket [wickett, the vulva] lete har tak a fumygacyon of good savour.

This passage is a paraphrase of one in the Viaticum (VI, 11) of Isaac Judeus (died 932). The work of Isaac was made accessible to mediæval writers by the translation of Constantine Africanus (about 1070). This and other passages were, however, widely circulated in the works attributed to the Salernitan woman, Trotula, who lived in the eleventh century, though most of the writings ascribed to her are the product of the thirteenth century.

Appendix B.—The opening passage of Bodleian MS. Douce 37, Western 21,611, fourteenth century:—

Ure lorde god whan he stored þe worlde of all creaturs he made manne and woman and resonabull creaturs and badde hem wexe and multiply and ordende þat of hem ij shulde cume þe thurde and þat of þe man þat is made of hote and drye mature [matter] shulde come þe sede and þe woman þat is made of cold matyr [matter], and moyste, shulde receyve þe sede so þat þe tempure [temper] of hote and colde moyste and dry þe cchylde shulde be engendyrde. Ryht as we seen treys [trees] cornys [corns] and herbys mou [may] not growe with out resonabyll tempure [temper—mixture, compounding] of þe iiij [i.e., the four elements] and for as moche as whomen ben more febull and colde be nature þan men been and have grete travell in chyldyng þer fall oftyn to hem mo diverse sykenes than to men and namly to þe membrys þat ben longyng [belong] to gẹndryng wherfore in þe worshyp of oure lady and of all Sayntys I think to do myn ententyffe [i.e., perform my object, do my best] by synes for to draw oute of latyn in to englysh dyuerse causis of here maladyes, the synes þat þey schall know hem by & the curys helpyng to hem afture þe treatys [treatises] of diuerse mastrys þat have translatyde hem oute of grek into latyn. And because whomen of oure tonge done bettyr rede and undyrstande þys langage þan eny oþer an euery whoman lettyrde rede hit to oþir unlettyrd and help hem and conceyl [counsel] hem in here maledyes with owtyn schewyng here dysese [disease] to man i have þys drauyn and writtyn in englysh. And yf hit fall any man to rede hit I pray hym and scharge hym in oure lady be halve þat he rede hit not in no dys pyte ne sclaundur of no woman ne for no cause but for þe hele and helpe of hem. Dredyng þat vengauns myht fall to hym as hit hath do to oþer þit have scheuyd [spied] her preuytees [privities, privates] and sclaundyr of hem. Onderstandyng in certeyne þat þey have no oþer evylys þat no be a lyve than thoo women hade þat nou be syntes [saints] in hevyn.

Appendix C.—Introduction to British Museum MS., Sloane 2,463, folio 194 r., with which is identical Sloane 249, folio 120 v. Both are in fourteenth century handwriting.

For as moch as ther ben manye women that hauen many diuers maladies and seknesses nyhg to þe deth & thei ben shamefull to shewen and to tellen her greuaunces to eny wight Therefore I schal sumdele wrightte herre maladies remedye Praying to god ful of grace to sende me grace truly to write to þe plesaunce of god & to all womanies helpyng ffor charite axeth this that euery man shuld trauaile for helpyng of his brotheryn & his susteryn [sisters] after þe grace of god þat he hathe underfongyn. And thowgh women have diuers evelles & many greet greuances mo than all men knowen of as I seyd hem schamen for drede of repreuing in tymes comynge of discuryng [disclosing] of uncurteys [uncourteous] men þat love women but for her lusts and for her foule lyking And yf women be in dissese suche men haue hem in despyte and thenke noughte how moche dysese women haue or þan they haue brought hem in to þis world: and therfore in helpyng of women I wyl wright of women prevy sekenes the helpyng and that oon [one] woman may helpe another in her sykenesse & nought diskuren her previtees to such uncurteys men.

But neuertheles who so euer he be þat displesith [i.e., maltreateth, perhaps for dispisith] a woman for herr sekenesse þat sche hath of þe ordynance of god he doth a gret synne for he dispisith nought allonely hem but god that sendith hem such seckenesse for her best. And þerfore no man shuld dispise oþer for þe disese þat god sendeth hym but to haue compassion of hym & releuen hym yef [if] he myght.

[*Note.*—Since writing the above we have obtained a copy of the *Archiv für Geschichte der Medizin*, 1914, vol. vii. On p. 373 of that volume Professor Karl Sudhoff reproduces Plate I, lower section. He considers that the surgeon who has opened the body is demonstrating the seat of disease in the liver to the attendant physicians. The expression and pose of the figures, the obvious consternation of the dissector, the admonitory attitude of the physician and the monkish dress of his companion, as well as the manner in which the organs are scattered around, all seem to us to provide serious objections to this theory.]

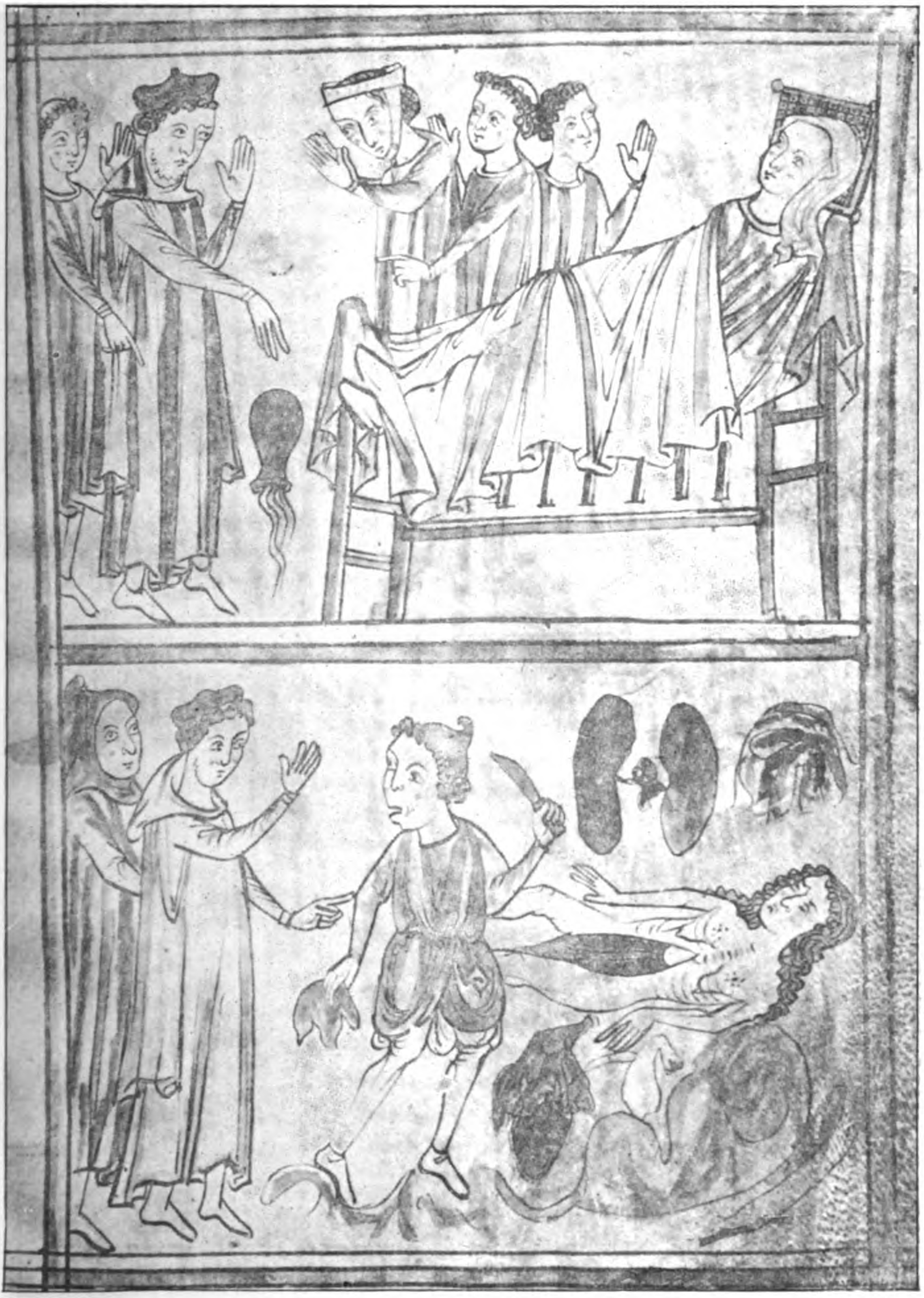


Plate I.

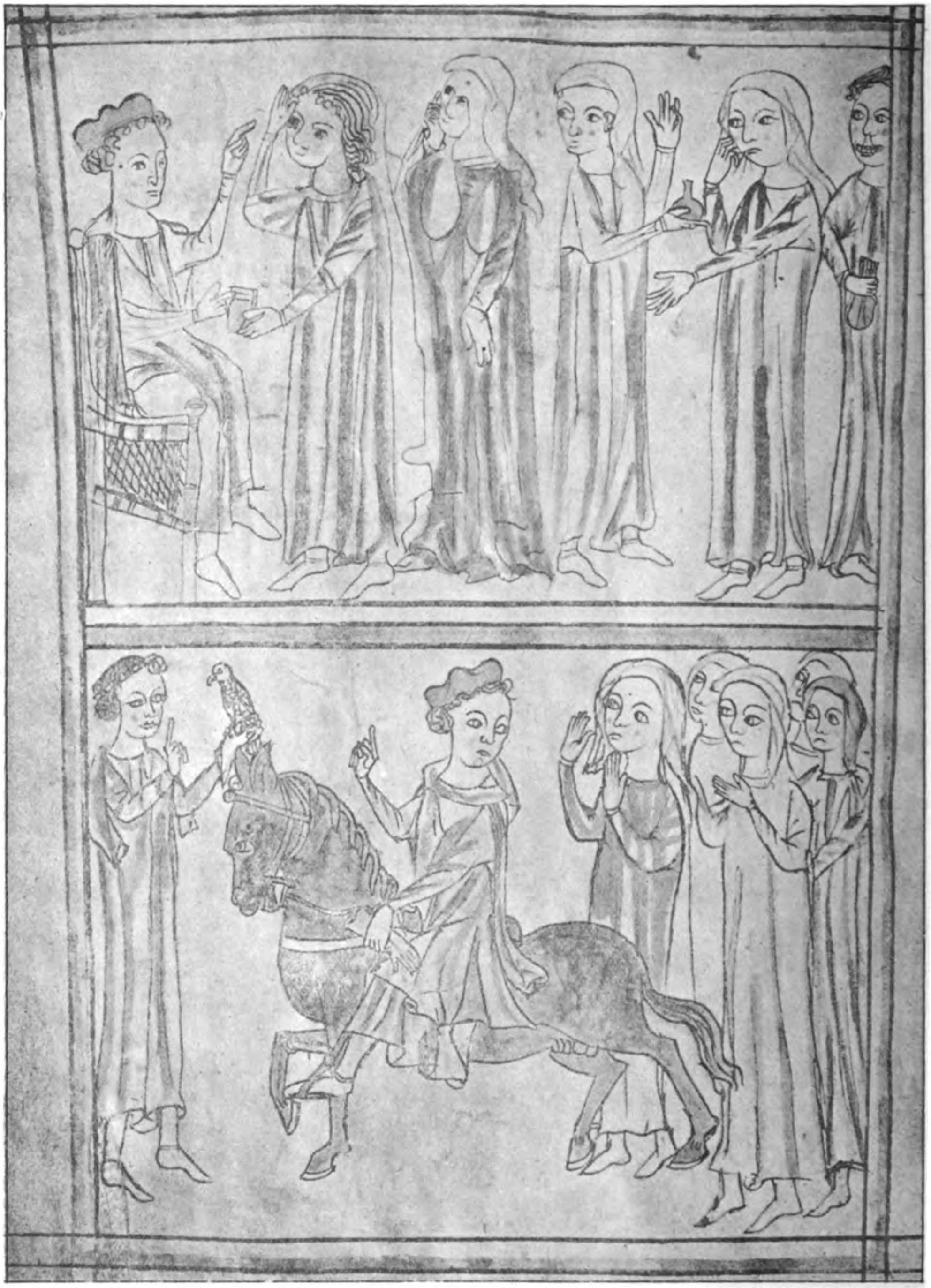


PLATE II.

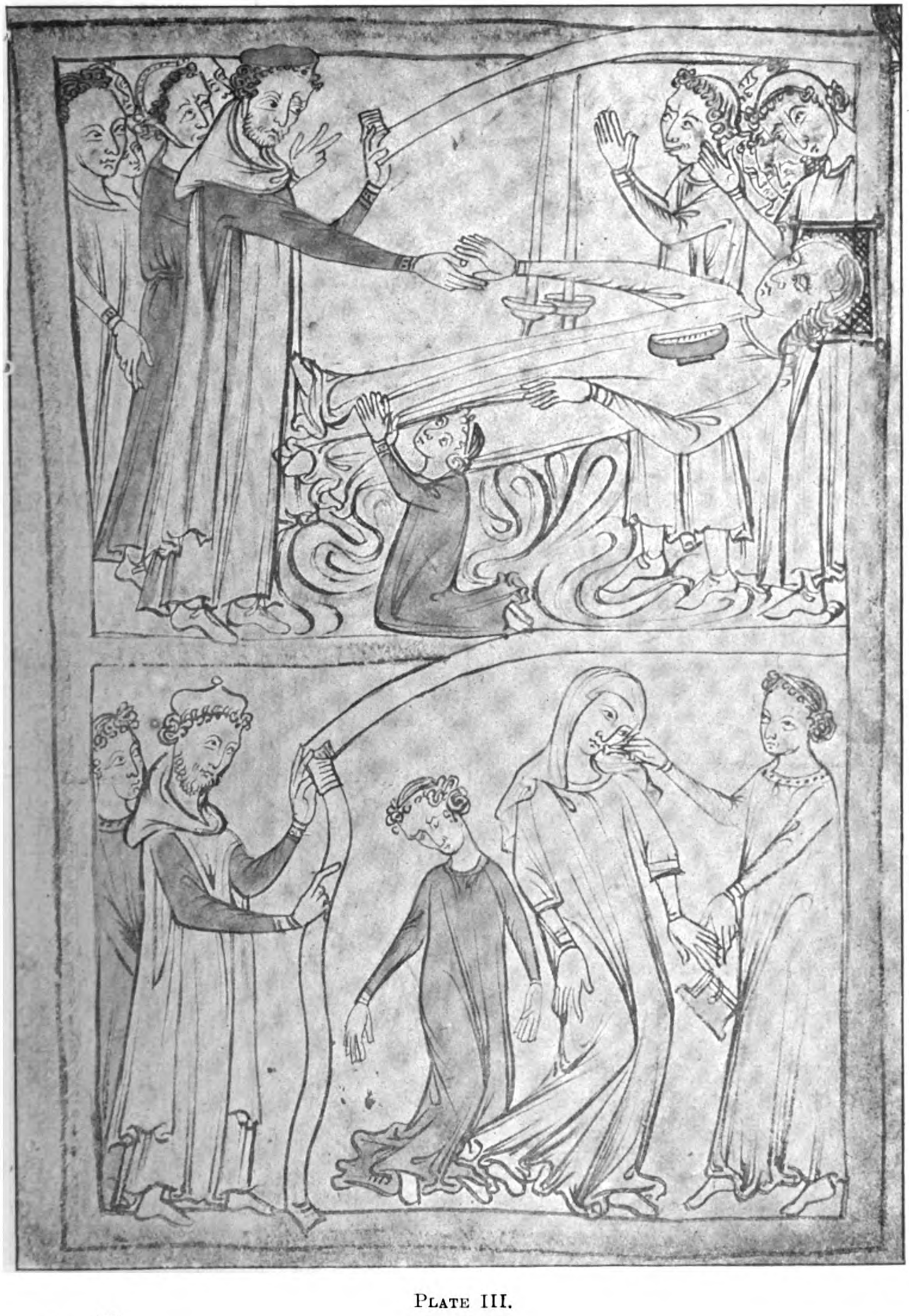


PLATE III.

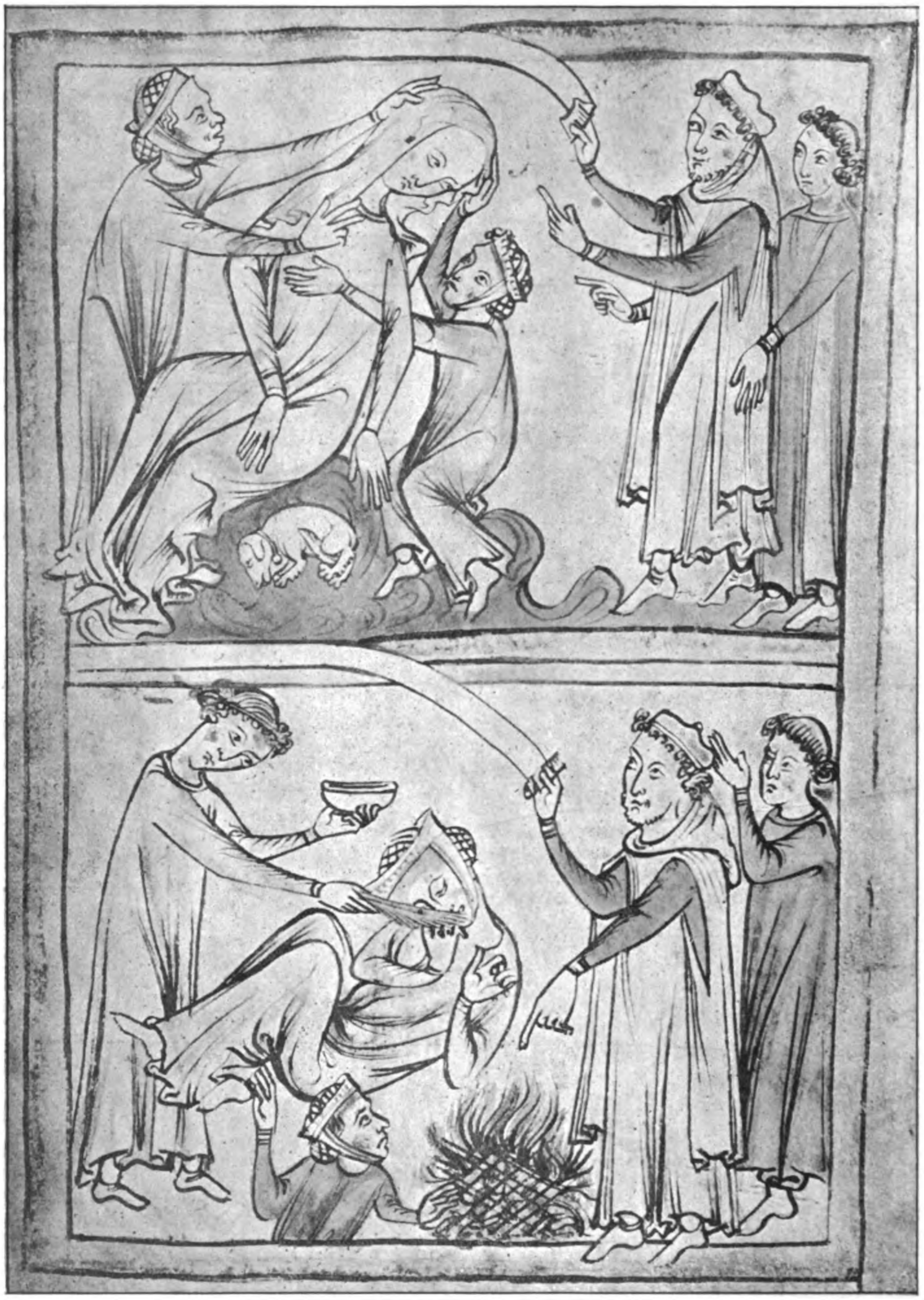


Plate IV.

(*November* 17, 1915.)

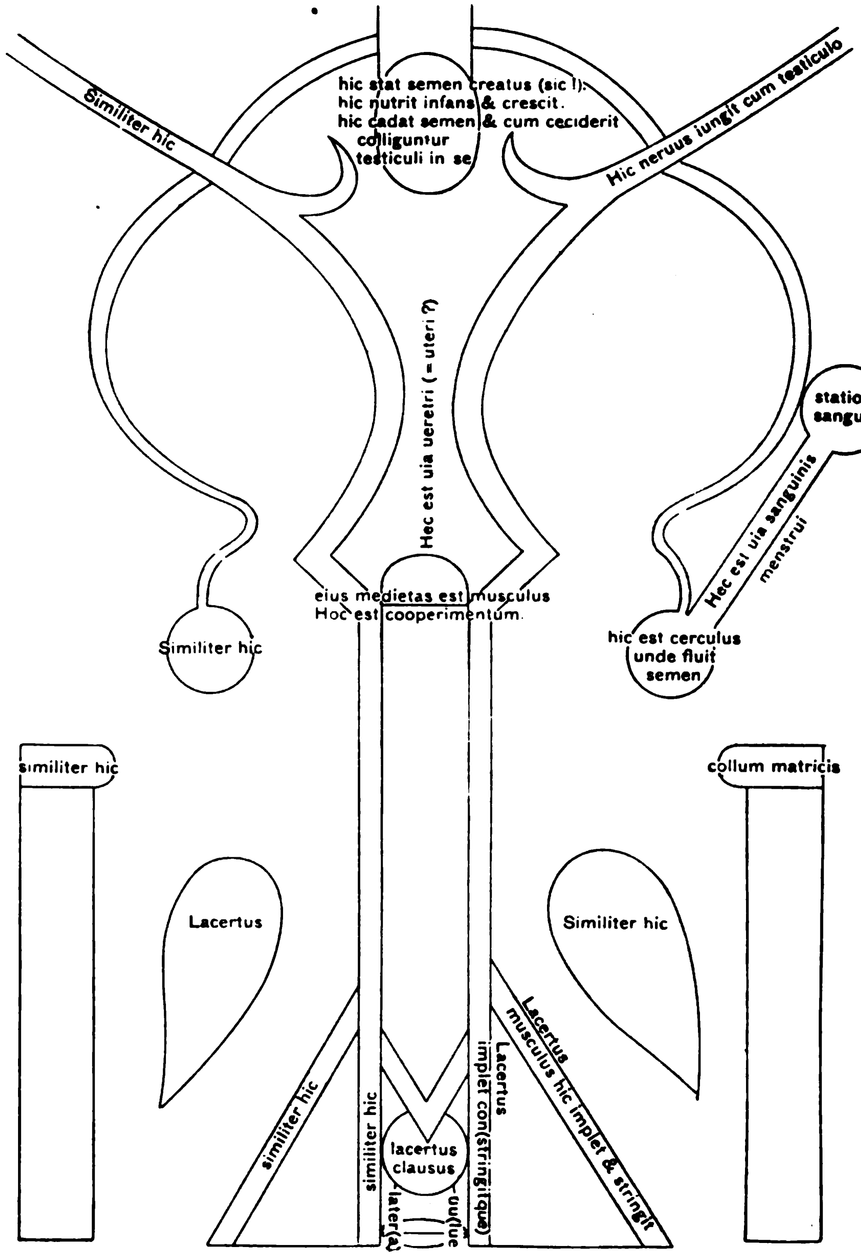
A Thirteenth Century Drawing of the Anatomy of the Uterus and Adnexa.

By CHARLES SINGER, M.D.

THE drawing or diagram here described is in the Bodleian Library, Manuscript Ashmole 399, of which it occupies the whole of folio 13 verso. It is the work of a thirteenth century hand, as is demonstrated by the script of the legends inserted to indicate its various parts. The handwriting of the legends is very similar to that of a short text covering the next few folios. This text, together with the diagrams of the fœtus *in utero* which accompany it, has been reproduced and described by K. Sudhoff in the *Archiv für Geschichte der Medizin* for 1911, p. 112. The picture is largely overwritten by a current hand of later thirteenth or of fourteenth century date. The material in this handwriting contains prescriptions for the use of pregnant and parturient women, of no special interest.

For the interpretation of our figure a few short phrases are all that remain to guide us, and there is doubtless some room for difference of opinion on several points. The chief difficulty arises from the double outline in the region of the fundus uteri. The full dark outline we regard as representing the non-pregnant position of this part of the uterus and the unshaded outline as the pregnant position.

The fundal region of the non-pregnant uterus is represented as open. In the outline of the pregnant uterus this gap is filled by the fœtus and its membranes, which have passed or forced their way upward so as to cause the fundus to assume its secondary or pregnant position. The two tubes which can be traced, one from each side of the fundus, are represented as shaded in the non-pregnant position and unshaded in the position which they assume during pregnancy. Only the latter is drawn in detail, and the tubes can be traced on either side to a round object, which we regard as the ovary or, in mediæval phraseology, the "testiculus." On the right side this bears the legend, "Hic est cerculus unde fluit semen." To the "testiculus" on the right side of the


hic stat semen creatus (sic !):
hic nutrit infans & crescit.
hic cadat semen & cum ceciderit
colliguntur
testiculi in se
Similiter hic
Hic neruus iungit cum testiculo
Hec est uia uretri (= uteri ?)
statio sanguinis
Hec est uia sanguinis menstrui
eius medietas est musculus
Hoc est cooperimentum.
Similiter hic
hic est cerculus unde fluit semen
similiter hic
collum matricis
Lacertus
Similiter hic
similiter hic
similiter hic
lacertus clausus
later(a)
uu(l)ue
Lacertus implet con(stringit)que)
Lacertus musculus hic implet & stringit

Key to Plate.

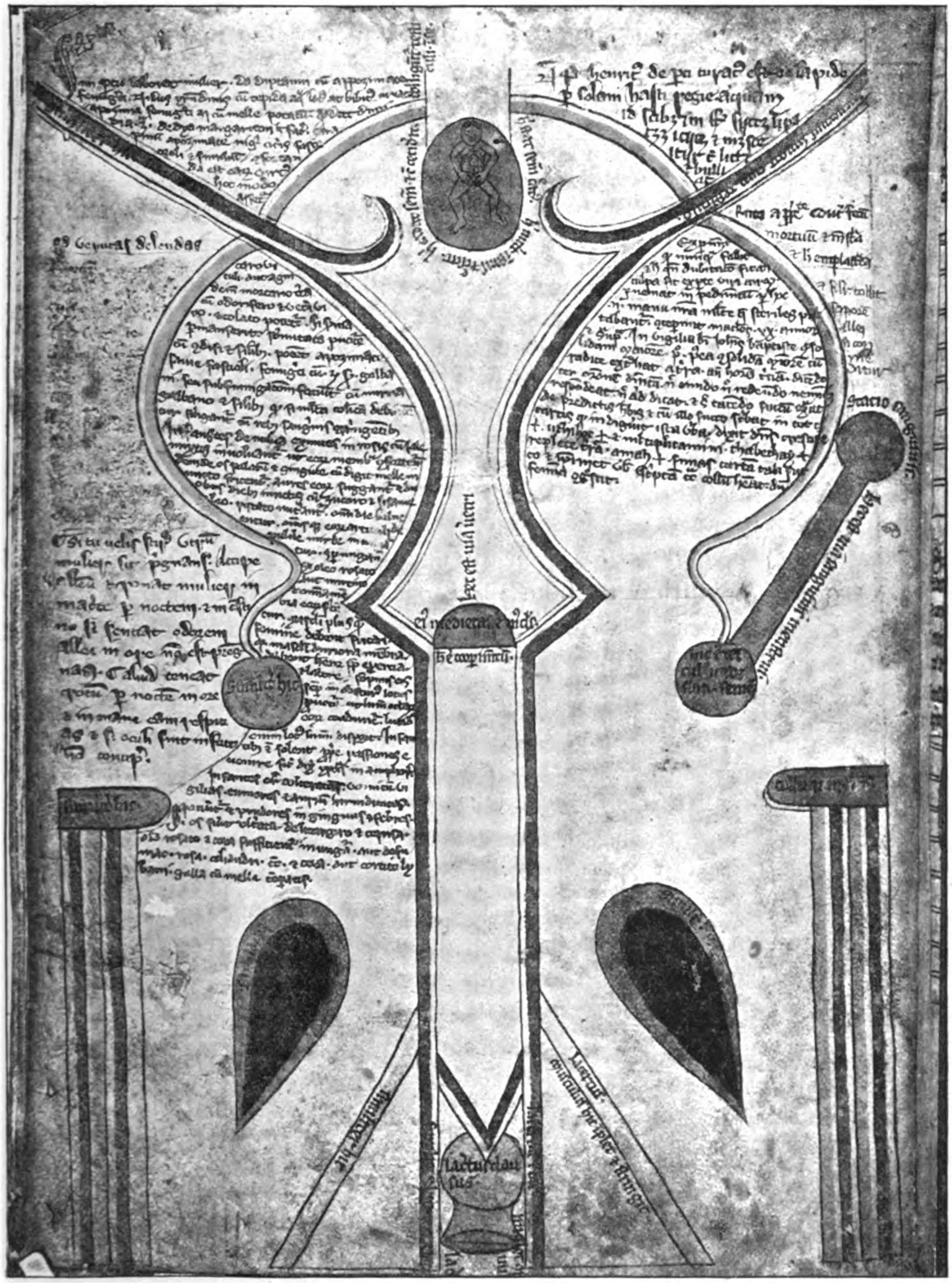


PLATE.

picture the "via sanguinis menstrui" leads from a second circle, the "statio sanguinis."

In the pre-pregnant stage the tube from the "testiculus" to the fundus uteri took a wholly different direction, passing downward instead of upward. On the right side of the picture we may read on this tube the inscription, "Hic nervus jungit cum testiculo." We would remind the reader that the term "nervus" was applied by mediæval writers not only to nerves but also to tendons, ligaments and ducts. To enable this duct to take the position described, we must suppose that the "testiculus" from which it leads also changed its relationship at the onset of pregnancy.

To explain the relation of ovaries and tubes to the embryo, we must turn to the physiological conceptions of the period. Mediæval writers, following Galen, Soranus and Constantine, invariably regard the menstrual blood as material for the nourishment of the fœtus. The reason that a pregnant woman did not menstruate was that the fœtus consumed the menstrual discharge. Our artist illustrates for us the mechanism by which he believed the change from the non-pregnant to the pregnant condition to take place. The fœtus developing at the fundus of the uterus can intercept the flow which normally reaches that organ through the tubes from the "testiculi." Thus the discharge which was previously evacuated into the uterine cavity is now absorbed by the fœtus. This belief is expressed in the legend at the upper part of the figure, where we may read, "Hic cadat semen et cum ceciderit colliguntur testiculi in se."

The majority of mediæval gynæcological writers following Soranus—or rather his Latin interpreter Moschion—describe the uterus as having seven chambers or cells. Our artist follows the better, though still erroneous tradition of Galen, who describes the uterus as bilobed, following the anatomy of the monkey which he was accustomed to dissect (Galen "De usu partium," IV, 4).

Having finished with the ovaries and fundus uteri, we now follow the uterus downward. The cavity of the uterus is called the "via uteri," and we are told that "ejus medietas est musculus." Below, the cervix is expanded, to be narrowed again at the neck, or "collum matricis," where it passes into the vagina. This neck is shut off from the vagina by a semicircular plug, cap, or "cooperimentum," an idea borrowed from Galen ("De usu partium," IV, 3).

The vagina is represented by thick parallel lines, which terminate abruptly below. In the lower part of the vagina are depicted various "lacerti" or muscles. The artist has endeavoured to indicate a constrictor vaginæ which he has marked "lacertus clausus." Other circular muscles, as well as oblique or dilator muscles and two oval muscular masses pointed at one end, are indicated. Beyond these are two vertical columns difficult to interpret; a first glance suggests a diagrammatic representation of the pelvic wall. The legend "collum matricis" which crowns one of them forbids this, and indicates rather an attempt to indicate two halves of a bisected vagina.

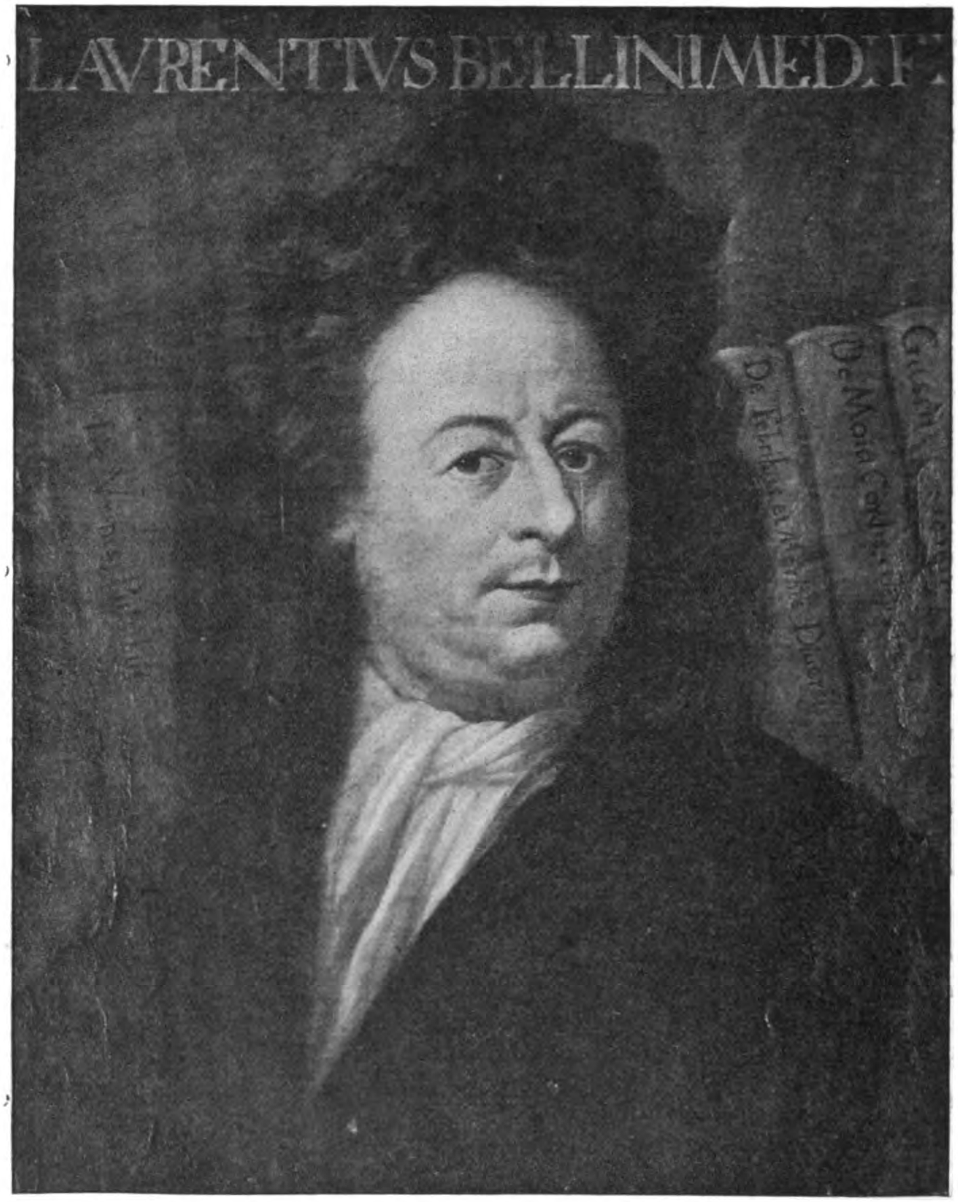
(*November* 17, 1915.)

A hitherto Unpublished Portrait of Bellini.

By Professor CHARLES GREENE CUMSTON, M.S. (Geneva).

THE portrait of Lorenzo Bellini, which is here reproduced (*see* next page), hangs in the passage leading from the Uffizi to the Pitti at Florence. For some unknown reason this portrait has escaped the attention of medical historians, and, as it has never been photographed, I had a reproduction made for my private collection. The artist is unknown, but a glance at the painting shows it is a good likeness.

Bellini—known to the medical world more particularly by his work "Exercitatio anatomica de structura et usu renum," Florentiæ, 1662, and several other contributions, including "Opuscula aliquot ad Archibaldum Pitcairnium," Pistoie, 1695; "De urinis et pulsibus," &c., Francofurti et Lipsiæ, 1685—was not merely an anatomist and physician, but a poet as well. That he was well versed in literature is quite evident from the following writings: "Lettere ne al Senator Pardolfo Pandolfini," and "Le Bacchende," a poem published at Florence in 1729.



A hitherto unpublished portrait of Bellini.

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*December* 15, 1915.)

DR. COCK exhibited the complete armamentarium of a middle nineteenth century East Anglian stone surgeon, including the instruments for lateral lithotomy with the gorget, crushing with the hammer lithotrite, and that for drilling with the watchmaker's bow and drill. He also showed Laennec's latest form of stethoscope and its English modifications in complete series.

(*December* 15, 1915.)

Of Superstitions concerning Menstruation.

By RAYMOND CRAWFURD, M.A., M.D.Oxon., F.R.C.P.Lond.

SUPERSTITIONS concerning the menses loom so large in the customs of primitive peoples and are so far from extinct among the lower orders of civilized nations as to be worthy of serious consideration. Many a farmer's wife in this country will still assure you that milk handled by a menstruous woman cannot be churned to butter or that hams will not take salt at her hands. That she has demonstrated the contrary in a series of experiments, month by month, year in and year out, has left unshaken the pillars of her faith: the foundations of faith stand firm in shifting soil.

ANCIENT VIEWS ON MENSTRUATION.

The wise men of old stood baffled before the mystery of the menses. Pythagoras called menstrual blood the froth of the blood, and held that it contained the superfluity of the aliment. Aristotle explained menstruation as a process necessary to get rid of the excess (περίττωμα) of blood that had accumulated in the interior of the body of the woman, and his theory is ardently supported 1,500 years later by his great commentator Averrhoes. Can it be honestly said that, apart from some suggestive evidence as to the interdependence of ovarian activity and catamenial function, medicine of to-day has any more satisfying explanation of the purpose of menstruation than theirs?

Where science has failed to establish a proof, religion has seldom failed to establish a theory. The Levitical ritual was in no doubt that impurities collected in the woman's blood were discharged in the menstrual flux, so that she underwent a recurring series of purifications. To the men of the monasteries menstruation was a symbol of the essential sinfulness and inferiority of woman, polluted alike and polluting. Men of such widely different stamp as Paracelsus and de Graaf both upheld this view of a menstrual purification, and I seem to hear some echo of it in the modern suggestion that the uterine mucosa, by expulsion of its surface layer, is preparing a sterilized bed for the fertilized ovum. Laboriously acquired histological knowledge competes on unequal terms with a plausible bacteriological preconception.

It must be remembered that till the middle of the seventeenth century, when the work of Harvey, de Graaf, and other pioneer embryologists led up to the discovery of the ovum in the human female, it was generally believed that the male semen and the female menses were the constituents out of which the child was formed, and by most the leading part was assigned to the menses. Pliny [16] defines the general belief in quite unequivocal language:—

> "The discharge, which is productive of such great and singular effects, occurs in women every thirty days, and in a greater degree every three months. In some individuals it occurs oftener than once a month, and in others again it never takes place. Women of this nature, however, are incapable of bearing children, because it is of this substance that the infant is formed. The seed of the male, acting as a sort of leaven, causes it to unite and assume a form, and in due time it acquires life and assumes a bodily shape."

We see how it came about that Aristotle applied to the menses the self-same explanation of a superfluity that Hippocrates had adopted in the case of the male semen.

MAGICAL BELIEFS.

Back of all these scientific and religious theories, and not infrequently casting a shadow upon them, stands a congeries of magical beliefs, which constitute the main subject of our present inquiry. The menstruous woman is possessed by an evil spirit; the spirit resides in her blood, and by the medium of her menstrual blood may exert its influence, for good or for harm, on her environment. The evil spirit may effect its entry into the woman in the form of a bird, or a lizard, or a serpent; hence the folk association of these animals with menstruation. It was the serpent that marred the primordial bliss of Eden. In Portugal women during menstruation wear drawers to prevent the access of lizards. On the Pennefather River the menses are said to be produced by a curlew operating on woman.

It is of the nature of magic, having postulated an all-sufficing cause, to take but little account of the intervening steps in the production of its effect. But in the matter of menstruation it has not been wholly silent. The natives on the Tully River, in North Queensland [12], attribute it to the breaking and discharge of the liver; what causes the breakage they do not know, but believe that menstruation has nothing to do with pregnancy. They are so far right in this, that it is quite certain repeated pregnancy may occur in those who have never menstruated. Segregation of women from the men during menstruation would lend colour to the belief that menstruation is not necessarily connected with conception. Among the Sandwich Islanders menstruation is believed to be the result of coition.

SUPERSTITIONS CONNECTED WITH THE MILK SUPPLY.

Many superstitions centre around the milk supply; much light has been thrown upon them by the masterly handling of Frazer [4]. Among the kaffir tribes of South Africa the menstruous woman must not drink milk, for if she do the cows would die. Even the maidens who attend a girl at her first menstruation are forbidden to drink milk for the same reason. Seclusion of the woman from the cattle and the taboo on milk last a fortnight—double the period demanded in the case of many other prohibitions.

Among the Bahimas a woman may not drink milk at her monthly times, but must eat vegetables and drink beer; the vegetarian diet implies a taboo on the flesh of the animals that yield the milk. Exception is made in favour of a girl at her first menstruation; her father then sets apart for her use an old cow, which is of small value, as it will soon pass out of milk. The conception that underlies these prohibitions is that of a sympathetic bond between the cow and its milk, which abides after the milk has left its body. Harm done to the milk inevitably involves the cow.

Again a menstruous woman is forbidden to cross those parts of the kraal frequented by the cattle, for if a drop of blood were to fall on such a path any cow passing over it would run great risk of dying from disease. The huts of a kaffir kraal are usually arranged in a circle with the cattle fold in the centre, and the circuitous paths taken by the women, in passing from hut to hut, may be seen outside the circle of huts, between them and the palisade which sometimes surrounds the kraal; but there is no such restriction on the walks of women who are past child-bearing, as they have ceased to be a source of danger. Nor is it only menstrual blood that is feared, for a Zulu custom forbids a wounded man to drink milk until he has submitted to a prescribed ritual.

Among many pastoral tribes of South Africa and India, women are either entirely prohibited from milking the cows, or are permitted to do so only in accordance with certain strict rules of ceremonial purification. Among the Todas of South India the men alone undertake the operations of milking and churning. The women may go to the dairy to fetch butter-milk, but they must approach it by an appointed path and stand at an appointed place to receive the milk. Such scrupulous care to shield the cattle and their milk from harm is commensurate with their importance in the economy of a pastoral people. It is interesting to encounter these primitive attempts at the provision of a pure milk supply, and to consider the different character of the impurities to be feared then and now.

BELIEFS ABOUT THE CROPS.

Superstitions such as we have already cited are in the nature of things most prevalent among the unsophisticated children of the soil, and wear a rural aspect. Others centre about the crops. Thus Pliny [17] says:—

> "If a woman strips herself naked while she is menstruating and walks round a field of wheat, the caterpillars, worms, beetles, and other vermin will

fall off from the ears of corn. Metrodorus, of Scepsos, tells us that the discovery was first made in Cappadocia, and that, in consequence of such multitudes of cantharides being found to breed there, it is the practice for women to walk through the middle of the fields with their garments tucked up above the thighs. In other places, again, it is the usage for women to go barefoot, with the hair dishevelled and the girdle loose; due precaution must be taken, however, that this is not done at sunrise, for, if so, the crop would wither and dry up."

Columella and Aelian both testify to the efficacy of this procedure, which finds a modern echo in Hiawatha's [14] injunction to Minnehaha :—

"You shall bless to-night the cornfields,
Draw a magic circle round them
To protect them from destruction,
Blast of mildew, blight of insect.
In the night, when all is darkness,
Rise up from your bed in silence,
Lay aside your garments wholly,
Walk around the fields you planted,
Round the borders of the cornfields,
Covered with your tresses only,
Robed with darkness as a garment."

For the most part, however, the influence of the menstruous woman on vegetation is harmful. According to Pliny—

"Seeds which are touched by her become sterile, grafts wither away, garden plants are parched up, and the fruit will fall from the tree beneath which she sits [16].

"Young vines, too, it is said, are injured irremediably by the touch of a woman in this state; and both rue and ivy, plants possessed of highly medicinal virtues, will die instantly upon being touched by her [17].

"All plants will turn of a yellow complexion on the approach of a woman who has the menstrual discharge upon her" [18].

Frazer says that in Galela women at their monthly periods may not enter a tobacco field, and in Sumatra they are forbidden the rice fields for fear of damaging the crop. At Saigon no woman is employed in the opium factory, lest she should turn the opium bitter, while Annamese women say that it is very difficult for them to prepare opium pipes during the catamenial period [3]. Even the lowlier forms of life are activated by this uncanny influence, so that beer and wine turn sour and vinegar will not keep. Clearly in this state she must be secluded from the food supply. We have seen that she is forbidden to take milk or meat at these times for fear of damaging the flocks. Some Central Australian [5] tribes will not allow a menstruous woman to gather a certain bulb, which is a staple food, for fear the crop of bulbs should fail. Again, no woman was formerly admitted to the great sugar refineries in the North of France during the boiling or cooling processes on the ground that the sugar would blacken if a woman were to enter during her period [3]. In Syria to this day women are not allowed to salt or pickle when their courses are on them, as it is believed that whatever they salt or pickle will not keep; and in Brunswick people think that if a menstruous woman assists at the killing of a pig the flesh will putrefy [6].

MALIGN INFLUENCE ON ANIMAL LIFE.

With an ever-widening circumference the malign influence affects all living things about the homestead. Bees will forsake their hives at her touch, for they have a special aversion to a thief and a menstruous woman, and a glance of her eyes suffices to kill a swarm of bees (Pliny) [19]. Among the Indians, an Omaha [6] woman may not approach a horse during her courses or she will grievously harm the animal. Pliny says:—

> "A mare big with foal, if touched by a woman in this state, will be sure to miscarry; nay, even more than this, at the very sight of a woman, though seen even at a distance, should she happen to be menstruating for the first time after the loss of her virginity, or for the first time while in a state of virginity. So pernicious are the properties of the menstrual discharge that women themselves, the source from which it is derived, are far from being proof against its effects; a pregnant woman, for instance, if touched with it, or if, indeed, she so much as steps over it, will be liable to miscarry" [17].

Pliny further records its value as an ingredient of abortifacient remedies and as a means of preventing impregnation. We have the recent testimony of Dr. T. G. Morton [2], of Philadelphia, that ignorant female abortionists still vend a nostrum for defeating pregnancy, one of the component parts of which is catamenial fluid. That it should possess this powerful ecbolic faculty is a mere matter of sympathetic influence, and for the same reason—

> "Reduced to ashes and mixed with oil of roses it is very useful; applied to the forehead, for allaying headache, particularly in women (Pliny) [17].

> "Dogs which may have tasted of the matter so discharged are seized with madness, and their bite is venomous and incurable" [16].

And again in a later passage Pliny says:—

> "It is universally agreed that, when a person has been bitten by a dog and manifests a dread of water and of all kinds of drink, it will be quite sufficient to put under his cup a strip of cloth that has been dipped in this fluid, the result being that hydrophobia will immediately disappear. This arises, no doubt, from that powerful sympathy which has been so much spoken of by the Greeks, and the existence of which is proved by the fact already mentioned, that dogs become mad on tasting this fluid" [17].

Yet one more instance may be taken from Pliny of its influence on animal life:—

> "That the ant, an insect so extremely minute, is sensible of its presence and rejects the grains which it has been carrying, and will not return to them again" [16].

OTHER PHENOMENA ATTRIBUTED TO THE CATEMENIAL STATE.

Household articles enjoy no immunity. Aristotle says that the glance of a menstruous woman takes the polish out of a mirror and that the next person looking into it will be bewitched. Pliny says that the tarnished mirror will recover its brightness if the same woman look steadily upon the back of it. Her glance also blunts the edge of steel and takes away the polish from ivory. Laurent [13] enumerates a whole catalogue of uncanny phenomena attributed to the catamenial state. Two girls believed that their shoes, stockings, and clothes stuck to them so closely that they needed help to remove them. There are many tales of the snapping of strings of harps and violins during the menses; also of the readiness with which women break things at these times, needles snapping, glasses breaking, and clocks stopping if touched. Iron will become rusty on contact with her, copper coated with verdigris, razors blunted, and linen boiling in the cauldron will turn black (Pliny) [16].

The powers of Nature even own the menstrual sway:—

> "For in the first place hailstorms, they say, whirlwinds and lightning even, will be scared away by a woman uncovering her body, while her monthly courses are upon her. The same, too, with all other kinds of tempestuous weather; and out at sea a storm may be lulled by a woman merely uncovering her body, even though not menstruating at the time" (Pliny) [17].

Seasonal and other influences are held to heighten the virulence of the discharge. Aelian lays it down that during menstruation woman is in communication with the starry bodies. Aristotle [1] says that wiseacres assert that the moon is female because the menstrual flux and the waning of the moon both take place towards the end of the month, and after the wane and the discharge both become whole again. According to Pliny:—

> "If the menstrual discharge coincides with an eclipse of the moon or sun, the evils resulting from it are irremediable; and no less so, when it happens while the moon is in conjunction with the sun, congress with a woman at such a period being noxious and attended with fatal effects to the man. At this period also, the lustre of purple is tarnished by the touch of a woman, so much more baneful is her influence at this time than at any other" [17].

Virginity, too, exerts a special power. Pliny says that "the nature of the discharge is most virulent in females whose virginity has been lost solely by lapse of time" [17]. The first menstruation also, as well as the first after loss of virginity, possesses a special potency.

CURATIVE PROPERTIES.

Among the beneficent properties of the menstrual discharge must be ranked its power to cure various ailments. The doctrine that the various secretions and excretions are imbued with the same properties as the body from which they are liberated led to their wholesale adoption into the primitive pharmacopœia. The scatophagy, at which Aristophanes jibed, was the parent of modern organotherapy. The first napkin used by a healthy virgin was preserved for use in cases of plague, malignant carbuncles, and other diseases; it was damped with water and laid on the part; the discharge was also used as a topical application in acute gout.

The menstruating woman has the divine gift of kings, for by her touch she can cure not only scrofulous ulcers, but "imposthumes of the parotid glands, inflamed tumours, erysipelas, boils, and defluxions of the eyes" [17]. Avicenna and Pliny both recommend menstrual blood as an application to all sores. In Bavaria it is held even to have prophylactic power against wounds, and to be able to extinguish fires. It was given internally for erysipelas and calculi, and was esteemed a good cosmetic to drive away pimples. In the Middle Ages it was a sovereign cure for leprosy [21].

The wise women of Pliny's day recommended it to be placed on a thread or the wool of a black sheep and worn in a bracelet as an amulet in tertian or quartan fevers. The midwife Sotira considered that better results were obtained by rubbing the soles of the patient's feet with it, and if possible this should be done by the woman herself without the patient's knowledge. She had also proved the efficacy of this method in reviving a person from an epileptic seizure. For quartan fever Ictidas, the physician, recommended sexual intercourse with a woman just beginning to menstruate. This is but one instance of the profound influence on males attributed to the menstrual state.

CUSTOMS AMONG PRIMITIVE PEOPLES.

Among the Australian [7] blacks the boys are taught from early childhood that if they set eyes on menstruous blood their hair will turn grey and their vigour abate prematurely. Consequently, the women must live apart at these times, and if a boy or young man is seen to approach she must call out at once, so that he may avoid her; he must not even cross the tracks made by women at such times. The woman is forbidden under pain of death to touch anything that the men use or to walk on the paths they frequent. An Australian black killed his wife when he found that she had lain on his blanket during her menstrual period and died of terror within a fortnight. Among the Bhinyan of South Mirzapur every house has two doors, one of which is used exclusively by the women during menstruation. These superstitious terrors help us to appreciate the mentality of those eminent scientists who find the contiguity of a woman an impediment to serious work, and who knows but that their unconscious influence may explain the trade unions' hostility to the collaboration of women in the workshop?

Among the people of the Lower Congo [22] a woman, during menstruation, may not cook her husband's food, nor any other man's, neither handle anything belonging to men, and must not return the salutations of any man. If a woman in this condition has to pass near some men who are likely to give her the equivalents of "Good morning" or "Good evening," she will deliberately put her pipe in her mouth as a sign that she cannot answer because she is unclean.

If in this state she will pollute mere man, still more will she pollute a sacred man. A menstruating Jewish woman was formerly forbidden to shake hands with a Rabbi, and women at these times were excluded from the Jewish synagogues and from the communion table of the early

Christian church. The Parsees, who reverence fire, will not permit a woman then even to look on a lighted taper; in Rome, too, it was the vestal virgins who kept alive the sacred flame. Medicine men, too, when about to compound their medicines, were in the habit of making a saving clause that the remedy would be effective, provided no menstruating woman approached their chamber during the compounding process. Surely nowadays the altogether inordinate apprehensions of both nurse and surgeon as to the evils of operation during the menstrual state are tinctured with the savour of this same superstitious fear?

Among the native Australians [8] the woman may not eat fish, or cross the water, or even go near it, or it will spoil the fishermen's luck; she may not even fetch water for the camp. Mrs. James Smith, in her account of the Roandik tribes, says that men have a special objection to setting eyes on menstrual blood, because it would enfeeble them in their fight against enemies, and they would be killed; and the Aruntas [9] of Central Australia believe that a draught of woman's blood would kill the strongest man. In Polynesia the vessels, garments and other property of a menstruating woman may not be used by others on pain of disease and death.

LOVE CHARMS AND OTHER MAGICAL POWERS.

Menstrual fluid has always been reckoned to possess a powerful influence over the affections of men, and has held pride of place as an ingredient of the love-charms administered by girls to would-be lovers. In modern Germany girls have administered drops of menstrual blood in coffee to their sweethearts to make sure of retaining their affections—a characteristic display of "frightfulness." According to Pliny [20] its action is effective on either sex, for "if a man takes a frog and transfixes it with a reed entering its body at the sexual parts and coming out of the mouth, and then dips the reed in the menstrual discharge of his wife, she will be sure to conceive an aversion for all paramours."

Menstrual fluid has other intimate relations to magic. Thus Pliny says that if it is sprinkled on the doorposts it will render ineffectual all the spells of magicians. Josephus speaks of plants acquiring magical properties by watering them with menstruous blood and the urine of a woman—a radio-active influence, no doubt! and by sympathetic affinity stains made on a garment by menstrual blood can only be removed by the urine of the same woman.

THE UNDERLYING IDEA.

The idea underlying these customs is that there resides in the menstrual blood some agent powerful for good or for harm; most of all is its power over the virility of the male, enfeebling him in the struggle for the survival of the fittest. The spirit of the woman resides in her blood and is transferable therewith to the male. It is a special aspect and a special application of the universal primitive blood-horror, founded on this same belief that the spirit of the person resides in his blood, and emerges with it for good or for harm. In addition, there is something unintelligible about menstruation, something uncanny, and the primitive mind explains it as due to some spiritual agency, which may harm the woman if she does not take certain precautions, and may pass from her and harm others if they neglect the prescribed precautions.

As examples of the need of self-protection, among the Tinneh Indians [10] a menstruating girl may not touch her own head with her hand, and, if it itches, she must use a stick to scratch it. In some races she is not allowed to feed herself. She must wear a fringe of shells or bones hanging from her forehead, so as to cover her eyes, as she is susceptible to any malicious sorcerer at such times. Among the Carrier Indians [7] menstruous women may not cut up the grebes, which are caught in great numbers, as by sympathy their blood would cause an unnaturally prolonged flux in the transgressor. Similarly, Shushap women are forbidden, during their seclusion at puberty, to eat anything that bleeds. There are numerous instances of women refraining, during menstruation, from fish and flesh, and confining themselves to a vegetable diet for the same reason. It is probably in obedience to the dictates of sympathetic magic that the physician of to-day administers preparations of blood for the cure of amenorrhœa in place of the old and proven hæmatinics.

The ordinances of religion, with regard to the segregation of the menstruous woman, fall into line with the customs of magic. As Frazer has said, the divinely inspired law-givers mistook their own ideas for revelations from heaven.

> "The Hindu law-giver, Manu, who professed to have received his institutes from the Creator, Brahman, informs us that the wisdom, the energy, the strength, the sight, and the vitality of a man who approaches a woman in her courses will utterly perish; whereas, if he avoids her, his wisdom, energy, strength, sight, and vitality will all increase" [10].

So, too, the Persian law-giver, Zoroaster, who claims to have derived his code from the mouth of the Supreme Being, Ahura Mazda, declares menstruation to be the work of Ahriman, the Devil, and lays down injunctions similar to those which the Hebrew law-giver Moses claimed to have derived from Jehovah.

THE PURPOSE OF THE TABOOS.

Just as the horror of menstrual blood is merely a special aspect of the horror of blood in general, so the taboos by which it is sought to segregate the menstrual woman are but a special application of the taboos by which any other supernatural agent undergoes segregation. The purpose that underlies them all is the isolation of the tabooed person from society. The primitive mind discriminates little between good and evil spirits, between holiness and pollution, for in each condition there exists a powerful supernatural force, be it active for good or for evil. So comes it, as Frazer shows, that the same taboos as apply to the menstruous woman are applied to divine kings and priests. Thus in many primitive races the divine personage may not touch the ground with his foot, and the sun may not shine upon him. We find him carried on men's shoulders, or stepping only on carpets or mats; and in many nations confined in palace, temple, or underground dwelling; the Mikado of Japan formerly observed both these taboos. Nowhere is he so free from danger and so harmless as suspended between heaven and earth, in contact with neither. In electrical language, he is insulated. He can neither discharge his supernatural energy with harmful violence, nor can it be drained from him to the detriment of that magical power on which the well-being of his people depends.

In like manner in some tribes the menstruous woman is compelled to dwell apart in a dark hut specially prepared for her use, or even in a hole in the ground or a dark cage [10]. When confined in holes in the ground they are sometimes covered with dirt, or sand, or a shelter of branches, or with mats. Special attendants are told off to wait upon them and supply their needs, and they may not eat any food which by sympathy would damage similar food supplies. In some races the girls at these times screen themselves from the sun by wearing huge hats. Elsewhere they are sewn up in hammocks, as though dead, leaving only a small hole for breathing. The rules that the girl may not touch the ground nor see the sun keep her suspended between heaven and earth;

she can poison neither of these great sources of life. But not only the safety of others, but her own safety is assured, if she be thus perfectly insulated. Zulu girls believe that they would shrivel to skeletons if the sun were to shine on them at puberty, and in some Brazilian tribes the girls think that a transgression of the rules would entail sores on the neck and throat. We find the same taboos as apply to menstruous girls enjoined on warriors who have shed blood and on young warriors at the time of their first campaign. They may not feed themselves; they may not scratch their heads except with a stick, for their hands are defiled with blood, and they need protection from themselves [11].

We have spoken of the universal horror of blood, which finds its highest expression in the lowest orders of civilization, and which extends also to, at any rate, the herbivorous group of higher animals. This instinctive horror primitive man explains and excuses by asserting the presence of a spirit in the blood: the blood is the life. Blood is therefore taboo, and taboos all that comes in contact with it.

As one reflects on the horror of menstrual blood, which in all primitive communities has led to prohibition, sometimes under penalty of death, of sexual intercourse during the menstrual period, the question inevitably suggests itself to one's mind whether the horror may not be the parent of the prohibition. The extreme divergence that subsists between the habit of man and the habit of animals in the period of sexual intercourse can hardly have failed to puzzle each of us at one time or another. Æsthetic and hygienic considerations have come to dominate the mind of highly civilized man to such an extent that we are apt to look no further for an explanation. Yet it is just in those lowly stages of civilization, in which æsthetic and hygienic considerations are of least account, that obedience to the prohibition is most strict; it is, indeed, a fundamental feature of savage ritual. With the development of civilization medical writers, from Hippocrates onward, actually recommended sexual intercourse during menstruation for sterility and other ailments; and in the Middle Ages it had become so common that preachers found it necessary to warn their congregations against it [3].

The belief, of very ancient lineage, that coitus during menstruation led to the birth of monsters was formerly very widespread. Ambroise Paré affirmed his belief, and rested it on a dictum of the non-canonical Book of Esdras, that "menstruous women shall bring forth monsters." Ancient mythology attributed the deformity of Vulcan to the union of Jupiter with Juno during her menstrual period. The Talmud went further and assigned disorders of the mind, such as epilepsy, cretinism, and insanity, to the same cause. The belief is not wholly dead nowadays.

SEXUAL ACTIVITY, HUMAN AND ANIMAL.

The identity of œstrus, or "heat," in the lower animals and of menstruation in the human female admits of no doubt; it is, indeed, possible to trace many of the intervening stages by which the one has been transformed into the other. Each condition is due to ovarian activity, and comes to an end with complete removal of the ovaries and any accessory ovarian tissue; the medium of stimulation is almost certainly an internal secretion of the ovary. In each condition the changes that occur in the external and internal generative organs may be broadly described as "active congestion," and are similar in character. The congestive phenomena in the external genitals are far more marked in animals than in the human female, though occasionally marked swelling and congestion may also be seen in the latter. But in this and other points, when animals have been submitted to ages of domestic influence, there is a tendency to approximate to the human type. Domesticity has done for animals what civilization has done for man.

Speaking generally, the human female, in the absence of pregnancy, menstruates once a month throughout her sexually effective life, and is capable of conception at any time. The nearest approach to this is the case of the monkey, who has a regular series of monthly periods, as does the human female, but has a limited breeding season—i.e., a limited period during which conception is possible. Both man and monkey have developed sexual activity to a maximum, but in the matter of reproductive capacity man seems to have outstripped the monkey; thus the latter occupies a position midway between man and other animals. Mares, cows, sheep and pigs exhibit a series of sexual periods during such limited portion of the year as constitutes their appropriate sexual season. The wild cat has one sexual season each year, but the domestic cat has three or four. The wild wolf has but one sexual period a year, but his kinsman the domestic dog has two or more sexual seasons each year. In all these animals conception is strictly limited to the sexual season. It must be remembered that the monkey, though not strictly speaking a domestic animal, has developed a high degree of domesticity of its own, and it is at least possible that the semi-erect posture may be an accessory factor in approximating its sexual features to the human.

SEXUAL SEASON IN THE HUMAN FEMALE.

Now there is evidence that in former times the sexual season of the human female was restricted, as is the case with most mammals: indeed, it is not improbable that the original type was universal in all primitive species and consisted of a single sexual season each year. Cook noted that not more than 10 per cent. of Esquimaux women menstruated during the long winter months; and as though heightened desire were correlated to less frequent menstruation, a sexual season of great intensity set in at the first reappearance of the sun, and little else was thought of for some time afterwards. Caldwell states that the Queensland natives have a distinct sexual season in September—i.e., in spring—and that they cannot be prevailed upon to do any work for some weeks at that time of the year. Wiltshire [23] quotes authorities to show that in a lowly state of civilization, such as exists among the women of Lapland, Greenland, the Faroe Islands, Tierra del Fuego, and the Guaranis of Paraguay, menstruation takes place only at intervals of several months. He suggests that the infrequent menstruation of girls at puberty—at intervals of three, four and six months—and the recurrence of a similar periodicity at the end of sexual life may be a reversion to a restricted ancestral type.

There is evidence also that in former ages the period during which conception was possible to the human female in each year was limited. In different countries there is a marked excess of births at some or other period of the year, and in general terms it may be stated that the tendency is for women both to commence menstruation and to bring forth children in the warmer months. Westermarck considers that the evidence points to two special seasons of sexual activity—spring and autumn—and that the activity is greatest toward the end of spring in the south of Europe and rather later in the north.

Though closely associated, conception and menstruation are separable functions and not necessarily interdependent, for conception may occur in the prolonged absence of menstruation. But statistics show an enormous preponderance of conceptions as occurring immediately after cessation of the menses, while a minimum is reached just before their commencement.

INFLUENCE OF DOMESTICATION AND CIVILIZATION.

The advantage to primitive man and to wild animals of a limited sexual season is that the young may be born at the most propitious season of the year, when food is most abundant and climate most favourable. Once an artificial supply of food and of warmth is assured, independent of season, the necessity for a special season of sexual desire and a special breeding season disappears, and gives place to a type of greater frequency, regardless of season. It is just these things that domestication and civilization afford.

Under domestication the frequency of œstrus is increased, and all the evidence goes to show that food and temperature are the chief efficient agents in producing the change. As to temperature, it is a familiar fact that in the bitch winter œstrus does not last so long as summer œstrus, and in the human female the menstrual flux is more readily established in summer than in winter. We may well look in the same direction for an explanation of the fact that, other things being equal, town-bred girls commence menstruation several months in advance of those reared in the country. Hard fare and laborious life tend to diminish the menstrual flow, while luxury and ease tend to increase it. In some parts of this country the hard-working farm girls still wear no protection during menstruation. Blood in the discharge is far more abundant in domesticated animals than in wild.

We see, then, that the circumstances of domestication and civilization tend to an increase and a greater frequency both of œstrus and of menstruation; perhaps one other parallel condition may help us a stage further in the attempt to unravel the process of transformation. We know that in most mammals non-satisfaction of sexual desire by intercourse tends to a quicker return of heat than normal; and it may be that the greater frequency of menstruation in the human female may in part be referable to the fact that civilization has brought it about that in the human female sexual desire is often compelled to go unsatisfied [15].

CONCLUSION.

These general considerations, and many others besides, are a necessary prelude to any reasoned attempt to answer the question whether the universal human horror of menstrual blood may have initiated the practice of abstinence from intercourse during the menses. Give an affirmative reply and you are still little nearer a solution, for you will find yourself confronted by the puzzling fact that with some domesticated animals, notably the bitch, there is a strong tendency, not more, to reject intercourse during the period of substantial flux, some preferring the commencement, but most the actual termination of the period of heat.

REFERENCES.

[1] ARISTOTLE. "Hist. Anim.," vii, p. 2.
[2] BOURKE. "Scatologic Rites of all Nations."
[3] ELLIS, HAVELOCK. "Psychology of Sex," 1900, ii.
[4] FRAZER. "Folklore in the Old Testament" and "Golden Bough."
[5] *Idem.* "Golden Bough."
[6] *Idem.* *Ibid.*, iii, pp. 302 *et seq.*
[7] *Idem.* *Ibid.*, iii, p. 202.
[8] *Idem.* *Ibid.*, i, p. 323.
[9] *Idem.* *Ibid.*, iii, p. 331.
[10] *Idem.* *Ibid.*, i, p. 325.
[11] *Idem.* *Ibid.*, iii, p. 208.
[12] HARTLAND. "Primitive Paternity," ii, p. 273.
[13] LAURENT. *Annales des Sciences Psychiques*, September-October, 1897.
[14] LONGFELLOW. "Hiawatha," Canto XIII.
[15] MARTIN. Hirst's "System of Obstetrics."
[16] PLINY. "Natural History," vii, p. 13.
[17] *Idem.* *Ibid.*, xxviii, p. 23.
[18] *Idem.* *Ibid.*, xix, p. 57.
[19] *Idem.* *Ibid.*, vii, p. 13, and xi, p. 15.
[20] *Idem.* *Ibid.*, xxiii, p. 13.
[21] STRACK, H. L. "Der Blutaberglaube in der Menschheit," ed. 1892, pp. 14-18.
[22] WEEKS, J. H. "Customs of the Lower Congo People," *Folklore*, xix, p. 418.
[23] WILTSHIRE. "The Comparative Physiology of Menstruation," *Brit. Med. Journ.*, 1883, i, p. 395.

DISCUSSION.

Dr. HERBERT SPENCER: With reference to Pliny's remark on the dulling of the surface of a mirror, there may be an element of truth in it. Roman mirrors were made of silver or silvered bronze, and I have known a patient have to leave off wearing silver ornaments during menstruation on account of the rapid tarnishing which occurred at that time. It is curious how widespread is the belief that menstruating women cannot cure bacon.

Dr. F. W. COCK: I am well acquainted with the objections commonly made against menstruous women being allowed to make butter or bacon. I am myself persuaded that some women do exert a deleterious effect in these circumstances, and have evidence which is satisfactory to me. If, as Dr. Spencer states, some women give out at these times some kind of exhalation which contains a sulphur compound, that will account for some of the results I have noticed.

Dr. J. D. ROLLESTON: Until comparatively recently, at any rate, some of the superstitions connected with menstruation have been firmly believed in by medical men. As late as 1878 a correspondence on the dangers of curing meat by menstruous women lasted for several months in the *British Medical Journal*,[1] until it was at last closed by the editor, who had permitted it "chiefly as an experimental example of the astonishing facility with which even among educated men superstitions, irrational and capable of easy disproof, retain their hold once acquired." There is a practice mentioned by Ploss and Bartels[2] prevailing among several Australian tribes of knocking out two teeth at the time of the first menstruation. The teeth are then carefully wrapped up in emu's feathers so that eagles should not find them; the belief being that if they do this larger teeth would grow up in the place of those extracted and cause a very painful death.

Dr. HINGSTON FOX: With regard to the influence of season on sexual activity, if the approach of the warmer season promotes conception, as has been suggested, there should be a large excess of births in the first quarter of the year. This is not so to any marked extent or constantly. Upon what evidence is the suggestion based? Is there, too, definite ground for the statement that conception is frequent immediately after menstruation, and not, as I have hitherto believed, immediately before that function is due, when the ovum is being set free?

---

[1] *Brit. Med. Journ.*, 1878, i, pp. 324, 353, 590, 633; ii, pp. 544, 654, 714.

[2] "Das Weib in der Natur und Volkskunde," 9. Auf., 1908, i, pp. 454 and 483.

(*December* 15, 1915.)

Some Notes on Edmund Harman, King's Barber, 1509 (?) to 1576.

By D'ARCY POWER, F.S.A., F.R.C.S.Eng.

INTRODUCTION.

NEEDING a short holiday after a long winter in various war hospitals, I bicycled recently into the Cotswolds, spending a week-end at Burford, in Oxfordshire. I visited the noble church, and my attention was at once arrested by a photograph of Holbein's picture of Henry VIII and the Barber-Surgeons, which rested against a monument of classical design in the north aisle (fig. 1). Inquiry showed the monument to be a cenotaph placed there by Edmund Harman, King's Barber, and one of the attesting witnesses to the will of Henry VIII. Harman married a Burford wife, had by her sixteen children, and spent the latter part of his life in the large house he had built in his adopted town, dying in the neighbouring village of Taynton, where he is buried. So much I knew already. But as he lived at Court through the critical time of the Reformation, it seemed that his history might repay further investigation. The results I bring before you this afternoon.

LINEAGE.

The Harman pedigree, which has fortunately been preserved, shows that he was the third child, and second son of Robert Harman, of Ipswich, by Johanna, daughter of — Hewick, Esq., of London. His grandfather was Paul Harman, also of Ipswich, whilst his great-grandfather was Peter Harman of the Steelyard. The Steelyard was situated in Lower Thames Street. The King's Beam was kept there, that is to say, it was the place where imports were weighed for duty. It is possible, therefore, that Harman, the grandfather, may have been employed in some official capacity which yielded sufficient remuneration to enable the next two generations to live in Suffolk. The Harmans, at any rate, became a well-known county family, but the name was not uncommon at the time, for Henry Harman, Clerk of the Crown under Henry VII, lived in Kent. It is possible that Edmund Harman may have been a protegé of Wolsey, who also came from Ipswich.

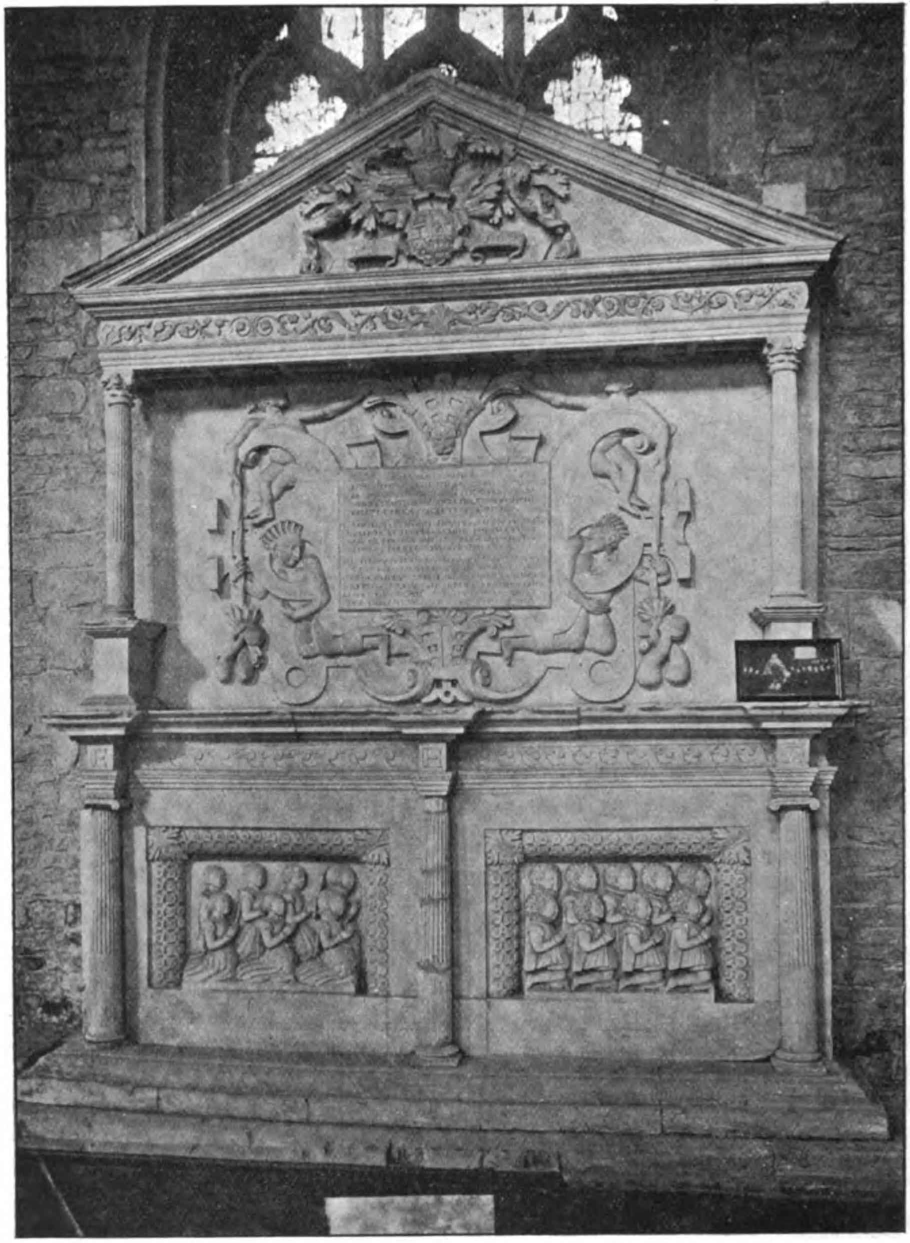
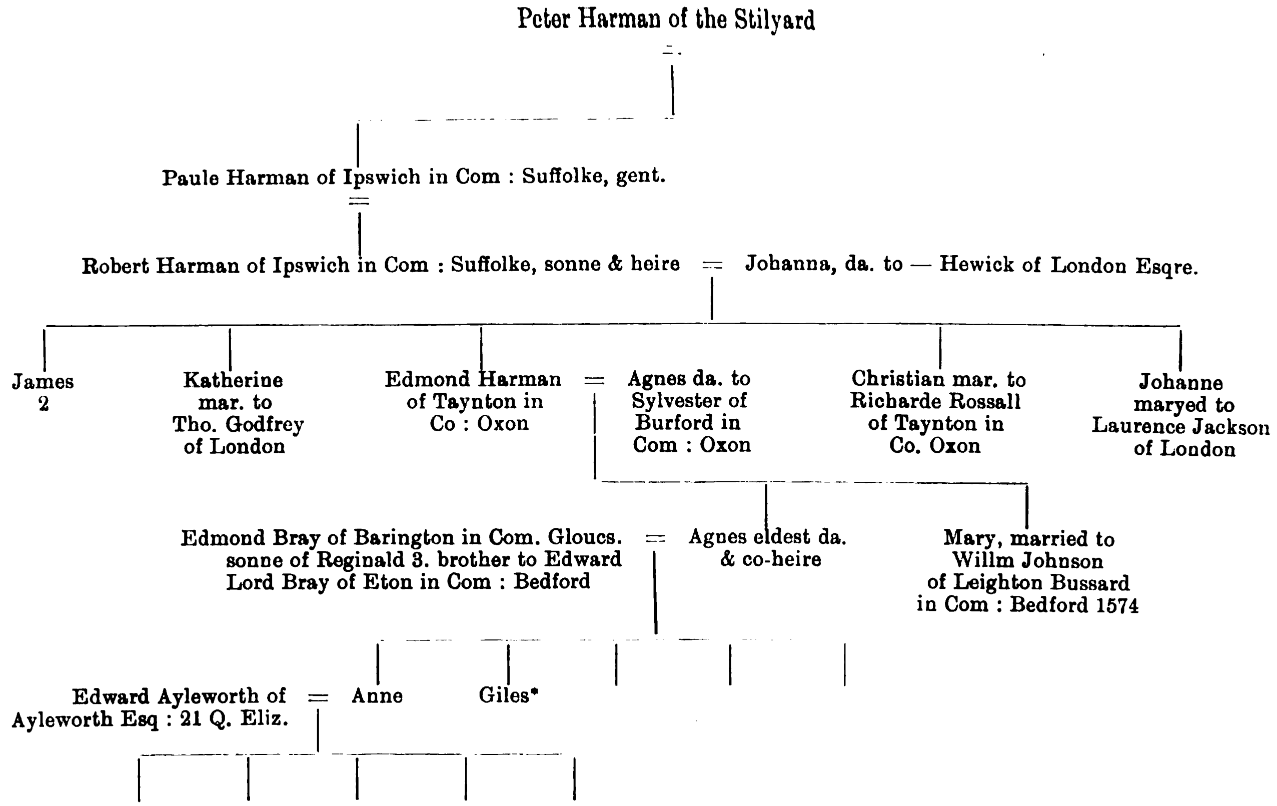


FIG. 1.

Cenotaph in Burford Church erected by Edmund Harman in 1569.

HARMAN OF TAYNTON.


Peter Harman of the Stilyard
Paule Harman of Ipswich in Com : Suffolke, gent.
Robert Harman of Ipswich in Com : Suffolke, sonne & heire = Johanna, da. to — Hewick of London Esqre.
James 2
Katherine mar. to Tho. Godfrey of London
Edmond Harman of Taynton in Co : Oxon = Agnes da. to Sylvester of Burford in Com : Oxon
Christian mar. to Richarde Rossall of Taynton in Co. Oxon
Johanne maryed to Laurence Jackson of London
Edmond Bray of Barington in Com. Gloucs. sonne of Reginald 3. brother to Edward Lord Bray of Eton in Com : Bedford = Agnes eldest da. & co-heire
Mary, married to Willm Johnson of Leighton Bussard in Com : Bedford 1574
Edward Ayleworth of Ayleworth Esq : 21 Q. Eliz. = Anne
Giles*

* The genealogy of the Brays of Barington can be traced to 1725 in Atkyns' "History of Gloucestershire."

The first mention of Edmund Harman occurs in 1530, when he was admitted to the freedom of the Barbers' Company. If he obtained his freedom in the usual way *per servicium* after an apprenticeship of seven years, his age at this date would be 21, and he must have been born at some time in the year 1509. An examination of the Apprenticeship books, which were regularly kept at the Barbers' Hall, will show the date and the name of his master. They are not available at present, but when the War is over I hope to consult them.

EARLY LIFE.

I find nothing else about him until the year 1535, when there is an entry in the State Papers (Domestic Series) to the effect that on June 22 "Plate was conveyed to Windsor by the hands of Edmund Harman." He was already in the King's service, therefore, and the next entry proves that he was one of the King's barbers, and had received the first of the grants which enriched him so rapidly in the course of the next few years. The entry runs:—

> "On 24th February 1535-6 Edm. Harman, the King's Barber and one of the Privy Chamber to be bailiff of Hovington and to have the keeping of the Manor Place and the farm thereto belonging with fees of £5 a year during the minority of (*blank*) Berkley, Lord Berkely, son and heir of the late Lord Berkley deceased, with all profits belonging to the said bailiwick as enjoyed by Richard Herwood, late bailiff."

This (*blank*) Berkley was Henry, the posthumous son of Thomas, Lord Berkeley, who died at Stone, in Kent, on September 22, 1534, his son being born on November 26, 1534, nine weeks and four days after his father's death. At the death of King Edward VI, on July 6, 1553, and the consequent failure of the heirs male of the body of Henry VII, this Henry Berkeley obtained possession (under the entail of 1488) of the estate of Berkeley, and on September 8, 1554, a Royal Warrant granted him a special delivery of his lands, although he was still under age. He died on November 26, 1613.

Hovingham is in the North Riding of Yorkshire, between Gilling and Malton.

DUTIES OF THE KING'S BARBER.

The King's barbers at this time were Nicholas Simpson, Edmund Harman, and John Pen. They are all known to us by Holbein's picture. The barber took his term of duty a month at a time. The

"Liber Niger Domus Regis" (Harl. MS. 642) states that only fifteen persons are allowed to enter the Privy Chamber of King Henry VIII, the King's barber being one of them.

"Item, it is also ordained that the King's Barber shall be daily at the King's uprising, ready and attendant in the King's Privy Chamber, there having in readiness his Water, Basons, Knives, Combs, Scissors, and such other stuff as to his room doth appertain for trimming and dressing of the King's head and beard. And that the said Barber take a special regard to the pure and clean keeping of his own person and apparel, using himself always honestly in his conversation without resorting to the Company of vile persons or of misguided women in avoiding such danger as by that means he might do unto the King's most Royal person, not failing thus to do upon pain of losing his room and farther punishment at the King's pleasure."

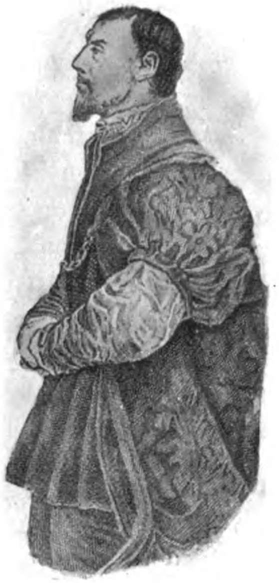


FIG. 2.

Edmund Harman, from Holbein's picture in the Barbers' Hall, London.

The wages were 50s. a quarter with "a bouche of Court," the "bouche" being an allowance of meat and drink for himself and a stated number of attendants. It was convertible into money.

THE KING'S PACKER.

The next entry is interesting. It shows that Harman had already proved himself a trustworthy servant, and it may mean that the Harman family had maintained some relationship with the City from the time of the great-grandfather of the Steelyard. It is dated September 7, 1536:—

> "Edm. Harman, a groom of the Privy Chamber, is appointed one of the packers of woollen and other cloths, leather, pewter and other merchandise to be packed, tunned, piped, barrelled, or by any other means to be included, chested, or trussed in the City of London with the moiety of fees for packing, weighing, and numbering merchandise" [scale of fees set forth].

The preamble states that collusion between the common packer of the City of London, appointed by the Mayor, and the merchants has defrauded the revenue, and that upon the custom officers of London deputing one of the waiters at the Custom House to be jointly present with the said common packer at the packing of merchandise, the officer so deputed (for want of the King's patent) not only received no wages, but was often repulsed by the said common packer.

Harman held the office of common packer for exports for some years, and it proved to be profitable as well as honourable. On October 1, 1540, the Privy Council met at Dunstable. There were present: the Great Chamberlain, Durham, Treasurer, Master of the Horse, Wriothesley, Chancellor of Augm.

> Business: "Upon complaint of the French Ambassador that certain lead of a merchant of Rouen was stayed in London for package money. Edm. Harman, one of the King's Barbers, packer at London was ordered to deliver the lead until the matter was tried and not charge strangers with package money for lead until it was seen whether the treaties and the late proclamation in favour of strangers allowed."

A note is appended to this entry that in 1545 package money was 4d. a fother and tin 4d. a hogshead. A fother of lead weighed 19½cwt.

These entries show that Harman was the King's Revenue Officer for exports at the Port of London. The duties, no doubt, were performed by deputy and the supervision only occupied a part of his time. On May 3, 1536, he brought "Garderobe stuff to London," and on December 10, in the same year, it is stated that it consisted of "hangings, curtains, feather beds, &c., some coming from Kew, others from Greenwich." Later in the year he had gained promotion at the Wardrobe, for in June, 1536, it is noted that "Edmonde Harman [is] nowe Keeper" [of the Wardrobe].

GRANTS.

On June 12, 1537, "Edm. Harman, a groom of the Privy Chamber, was granted to be keeper of Leving, alias Perlaune, Bucks, in the King's hands by the attainder of Henry Norres and also Keeper of the gardens, orchards and park of Perlaune." Henry Norres was executed at the Tower on May 17, 1536, on suspicion of an intrigue with Anne Boleyn. He sided early against Wolsey, and was one of the main instruments in bringing about that statesman's fall. He was a Gentleman of the King's Chamber and was one of the most intimate friends of Henry VIII. In 1518-19 he was appointed Bailiff of Ewelme, and in 1525 he received the Keepership of Langley New Park, Bucks, and was made bailiff of Watlington. His grandfather, Sir William Norris, was Steward of the Manor of Burford (amongst other offices), granted to him by Henry VII. Edmund Harman at different times in his life held property at Langley and at Burford, so that he seems to have profited considerably by the attainder of Norris.

In 1537, Edmund Harman was chosen a member of the Court of Assistants of the Barbers' Company, and he appears eleventh on the list of the twenty-six members, Nicholas Simpson being Master of the Company for the year.

In the following year (1538), "Edmund Harman, one of the pages of the King's Privy Chamber is to have the annual rent of £24 ; 13 ; 4 paid by the Burgesses of Ludlow for the fee farm of the borough and all the lands &c. in Ludlow (except the site of the Castle there and a meadow called 'Castell's Mede') and in Staunton Lucy which used to be in the charge of the Bailiffs of Ludlowe, with arrears of the said rent from the feast of SS. Simon and Jude."

The grant was given at Westminster Palace, and is dated 9 May 30 Henry VIII [1538].

On June 27 in the same year, "Edm. Harman, one of the grooms of the King's Chamber to be Steward of the Lordships or Manors of Langley Marrays alias Langley Marishe & Wirardysbury and keeper of the Park of Langley Marrays, Bucks. in as full manner as Sir Edward Baynton and Henry Seymour held the same; with the herbage and pannage of the said parks."

Wraysbury is situated in Buckinghamshire, between Old Windsor and Staines; the Great Western Railway now runs through Langley, between West Drayton and Slough. Sir Edward Baynton, of Bromham-Baynton, Wilts, was a favourite courtier of Henry VIII, Vice-Chamberlain to three of his Queens, a friend and patron of Latimer. Foxe, in his "Book of Martyrs," prints some letters which passed between Baynton and Cranmer about the year 1533 (vol. iii, pp. 370, *et seq.*, ed. 1641).

Amongst the entries in the Domestic State Papers for the year 1538 are:—

> "The King's Payments. Quarter's wages at Lady Day 1538. Edmund Harman, groom of the Privy Chamber 50s.; Hans Holben, Painter £7; 10; 0; John Alif Surgeon 100s."

INCORPORATION OF THE GUILD OF SURGEONS WITH THE COMPANY OF BARBERS.

There does not appear to be any entry about Harman during the year 1539, but he probably served the office of Senior Warden in the Barbers' Company, John Pen, the King's barber, having been elected Master. The name of the Senior Warden is not given for some reason, his office alone is specified, so that the entry for the year reads: "John Pen, K.B., Master; K. Barber, John Hutton, Henry Pemberton, Wardens." There are but three King's barbers, and Nicholas Simpson had already served his term of Mastership in 1537, so that the unnamed King's barber must have been Edmund Harman. It is probable, therefore, that he was elected Senior Warden, and out of his turn, that he might be Master of the Company in 1540, the year when the Barbers and Surgeons were incorporated by Act of Parliament to form the "mystery and cominalty of Barbers and Surgeons of London for evermore." The Act received the Royal Assent on July 25, 1540, nearly at the end of Pen's year of office as Master, so that the work of guiding the earliest steps of the new Company fell upon Harman, and it may have been felt advantageous to secure the services of one who was known to have the ear of the King. The influence of the medical profession at Court at this particular time was great. Dr. Chamber and Dr. Butts represented the medical side; Vicary, Ayliffe and Ferris the surgical; whilst Simpson, Harman and Pen were the barbers, and were consequently allied to the general practitioners. The King's interest in the union was shown actively by his presentation of a silver-gilt grace cup and cover (fig. 3), which is still one of the treasured possessions of the Barbers' Company. The design of the cup is said to be in the style of Holbein, and in all probability was from his studio. It has four pendant bells, and each person drinking from the cup empties its contents, and in handing it to his neighbour rings the bells. Pepys drank the King's health out of it on February 27, 1662-63. The cup was stolen when the Hall was burglariously entered on November 7, 1615. The thieves were discovered and the cup was regained. Two of the burglars were hanged in the following December, and the minute concludes: "In January Sames was taken and executed. In April 1616, Foster was taken and executed. Now lets pray God to bless this house for ever from any more of these damages, Amen." It cost the lives, therefore, of four men. It was sold during the Civil War, but was repurchased by Mr. Alderman Arris, who gave it back to the Company in 1647.

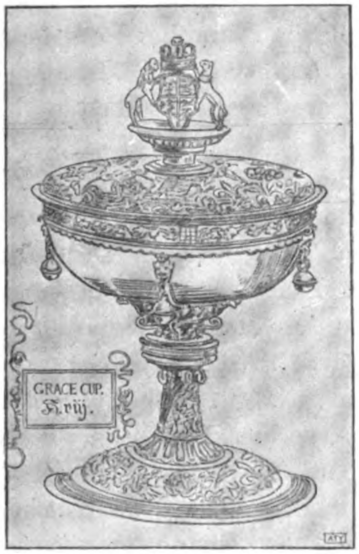

GRACE CUP.
H.viij.

FIG. 3.

Grace cup presented to the Company of Barbers and Surgeons by King Henry VIII.

The union of the Barbers' Company with the Guild of Surgeons is commemorated in Holbein's well-known picture. By artist's licence Holbein has shown King Henry VIII in the act of handing a non-existent document to Vicary, who was not Master of the Company until

September, 1541, although the Act of Parliament received the Royal Assent on July 25, 1540, nearly at the end of John Pen's year of office as Master. The historical value of the picture enables us to forgive such trivial inaccuracies, especially when it is easily possible to correct them if it be borne in mind that the painting is merely commemorative. In the picture Harman is placed third in the front row on the left hand side of the King. He is the first person without a cap or hood on his head, signifying that he held no degree in medicine, and that he was not a member of the Guild of Surgeons, who, from time immemorial, had claimed the right to wear a cap and call themselves Master or "Magister." He wears (fig. 2), however, his gown as a member of the Court of Assistants of the Barbers' Company, and a chain round his neck as a Court official. He has a round head and a handsome, merry-looking face, with moustache and scanty beard. In addition to his livery gown trimmed with fur, he wears the livery hood of the Company—per pale gules and sable.

The year 1541 is again without any official record of Harman, but in 1542 his position in the world began to be recognized and his influence solicited. Thus: "18th December 1542. Right well-beloved Mr. Gaites, Mr. Bucher and Mr. Harman in my most heartiest wise I recommend me unto your masterships," and the petitioner begs them to move Lord Parre to speak to the Lord Chancellor and Mr. Dakers to make an end in the suit between the writer and the Lord Chancellor's servant. A verdict had been given in the matter in the Guildhall before the Lord Mayor of London, "but the Chancellor's servant has troubled him ever since. Cannot sue him at the Common Law because he is my Lord Chancellor's servant." The petition is dated Greenwich, December 18 [1542].

THE WINDSOR MARTYRS.

The year 1543 was perhaps the most anxious time of Harman's life, since he and his wife came very near martyrdom. The whole miserable story is told in Foxe's "Book of Martyrs" (vol. ii, pp. 441-556, ed. 1641); but let us begin at the end:—

"At Ampthill Aug. 15th 1543. Edm. Harman of Langley, Berks and Agnes his wife; Thomas Sternolde, gentleman of the King's Chamber; William Snowball, yeoman cook *pro ore* of New Windsor, Berks and Margaret his wife *inter alios*. Pardon of all heresies for which they are accused before the King's Council and before John Bishop of Sarum and other Commissioners under the six articles in Co. Berks, because in the year 34 Henry VIII [1542] at New Windsor they aided, abetted, favoured, counselled and consented with one Ant. Pearson, Clerk, there lately condemned and burnt for heresies against the sacrament of the Altar."

The Six Articles, as is well known, were in favour of transubstantiation, against the marriage of priests, and in favour of masses and auricular confession. The Act was passed in 1540 and in consequence—

"such a number out of all parishes in London and out of Calais and divers other quarters were apprehended that all the prisons in London were too little to hold them, in so much that they were fain to lay them in the Halls. At the last by the means of the good Lord Audley such pardon was obtained of the King that the said Lord Audley then Lord Chancellor, being content that one should be bound for another they were all discharged being bound only to appear in the Star Chamber the next day after All-Souls there to answer if they were called, but neither was there any person called nor did any appear."

At Windsor, unfortunately, there was no good Lord Audley, but Dr. Capon, Bishop of Salisbury, and Dr. London, a "minister of Satan and Warden of New College, Oxford." Capon was "the Abbot of Hyde, a great Clerk," to whom Henry wished the Pope to refer judgment of the divorce case, and he seems to have acted without any especial animus against the Windsor Martyrs. It was otherwise with Dr. John London, Rector of Ewelme in 1502, Warden of New College in 1526, who unfortunately became a Prebendary at Windsor just after the passing of the Six Articles. He began his persecutions as early as 1520, and in 1535 he was one of the most active and subservient of Cromwell's agents in despoiling the monasteries. It is said of him that when he obtained the surrender of a religious house he stripped it of everything that had a pecuniary value and sent the spoils to London, seized all the relics and defaced and destroyed whatever he could not remove, so that the bare walls of the buildings were alone left; "he was, indeed," says Gasquet, "the most terrible of all the monastic spoilers." He even imprisoned some of the Fellows of New College in the Bell Tower, and amongst them Peter Quinby, who died half starved with cold and lack of food. When his friends asked Quinby what he would eat, he said his stomach was gone from all meat except it was warden (pear) pie:—

"'Ye shall have it,' quoth they, 'I would have but two Wardens,' quoth he, 'baked, I mean, to be plain our Warden of Oxford and our Warden of Winchester, London and More, for such a Warden Pie might do me and Christ's

Church good, when other Wardens from the tree can do me no good at all.' Thus jesting he turned his face to the wall in the said belfry and so after his prayers slept sweetly in the Lord."

It was no matter of surprise that when Dr. John London was in frequent residence at Windsor the Lutherans and those who would not subscribe to the Six Articles were soon arraigned. Foremost amongst the protestants were Testwood, Person, Filmer and Marbeck.

Testwood.—Testwood was a skilled musician, and seems to have sung in the choir of St. George's Chapel, for—

> " there chanced a merry story of him between one Robert Philips, Gentleman of the King's Chapel and Testwood. The matter was this: Robert Philips was so notable a singing man (wherein he gloried) that wheresoever he came the best and longest song with most counterverses in it would be set up at his coming. And so his chance being now to be at Windsor against his coming to the Anthem a long song was set up called 'Laudi vivi' in which there was one counterverse towards the end that began on this wise, *O redemptrix et Salvatrix:* which verse of all other Robert Philips would sing because he knew that Testwood could not abide that ditty. Now Testwood, knowing his mind well enough, joined with him on the other part and when he heard Robert Philips begin to fetch his flourish with *O redemptrix et salvatrix* repeating the same one in another's neck, Testwood was quick on the other side to answer him again with *Non redemptrix nec salvatrix* and so striving there with *O* and *Non* who should have the mastery they made an end of the verse. Whereat was good laughing in sleeves of some but Robert Philips with other of Testwood's enemies were sore offended."

Person.—Of Person it is said:—

> "There was a certain Priest named Antonie Person which frequented much to Windsor about the year of our Lord 1540, and, using the talent God had given him in preaching, was greatly esteemed among the people who flocked so much to his sermons, which he made both in town and country, that the great priests of the Castle with other papists in the town were sore offended."

Marbeck.—Marbeck's crime was that he had "begun a great work in English called 'The Concordance of the Bible,' and had copied in his own handwriting the words of a learned man called John Calvin, that 'the celebration of the sacrament is the setting up of images of calves in the temple builded by Jeroboam.'"

Filmer.—The original of Henry Filmer's trouble began about the year of our Lord 1541, for—

> "after all the orders of superstitious and begging friars were suppressed and put down there chanced one, Sir Thomas Melster, which had been a friar before

and changed his friar's coat (but not his friar's heart) to be Vicar of Windsor. This priest on a time made a sermon to his parishioners in which he declared so many fond and foolish tales as that our Lady should hold out her breasts to Saint Bernard and spout her milk into his eyes with such like festival tales that many honest men were offended and especially this Henry Filmer, then one of the churchwardens, who was so zealous to God's Word that he could not abide to hear the glory of Christ so defaced with superstitious fables. Whereupon he took an honest man or two with him and went to the priest with whom he talked so honestly and so charitably that in the end the priest gave him hearty thanks and was content at his gentle admonition to reform himself without any more ado and so departed friendly the one from the other. And there was one in the town called William Simons, a lawyer, who hearing that Filmer had been with the priest and reproved him for his sermon took pepper in the nose and got him to the Vicar and did so animate him in his doings that he slipped quite away from the promise he had made to Filmer and followed the mind of Simons who, meeting with Filmer afterward, all-to reviled him saying he would have him before the Bishop,"

which, indeed, he did, and presently to the stake.

It was intended to make a clean sweep of the heretics at Windsor—where there were, no doubt, some of the inferior Court officials—before proceeding to attack those who were still nearer the King's person, so that—

"when Dr. London had been at Windsor awhile among his Catholic brethren and learned what Testwood was and also of Simons (who showed him Our Lady's nose as he called it) what a sort of heretics were in the town and about the same and how they increased daily by reason of a naughty priest called Anth. Person, he was so maliciously bent against them that he gave himself wholly to the devil to do mischief. And to bring his wicked purpose about he conspired with the aforesaid Simons—a meet clerk to serve such a curate—and other of like sort how they might compass the matter, first, to have all the arch-heretics, as they termed them in Windsor and thereabout, indicted of heresy and so to proceed farther. First, they drew out certain notes of Anthony Person's sermons which he had preached against the sacrament of the Altar and their Popish Mass. That done, then put in Sir William Hobby with the good lady his wife; Sir Thomas Cardine; Master Edmund Harman; Thomas Weldon with Snowbal and his wife as chief aiders, helpers and maintainers of Anth. Person. And also they noted D. Hains, Dean of Exeter and a Prebendary of Windsor to be a common receiver of all suspected persons. They wrote also the names of all such as commonly haunted Anth. Person's sermons and of all such as had the Testament and favoured the Gospel or did but smell thereof. Then had they privy spies to walk up and down the Church, to hearken and hear what men said and to mark who did not reverence the Sacrament at the elevation time and to bring his name to

Dr. London. And of these spies some were Chantry priests, among the which there was one notable spy whose name was called Sir William Bows—such a fleering [grinning] priest as would be in every corner of the Church pattering to himself with his portvis [hand breviary] in his hand to hear and to note the gesture of men towards the sacrament. Thus when they had gathered as much as they could and made a perfect book thereof Dr. London with two of his catholic brethren more gave them up to the Bp. of Winchester—Ste. Gardiner. Now Bishop Gardiner which had conceived a farther fetch in his brain than Dr. London had, made Wrisley and other of the Council on his side and, spying a time convenient, went to the King, complaining what a sort of heretics his grace had in his realm and how they were not only crept into every corner of his Court but even into his Privy Chamber, beseeching, therefore, his Majesty that his laws might be prosecuted. The King, giving credit to the Council's words, was content his laws should be executed on such as were offenders. Then had the Bishop that he desired and forthwith procured a Commission for a privy search to be had in Windsor for books and letters that Anth. Person should send abroad, which commission the King granted to take place in the town of Windsor but not in the Castle."

This exception no doubt saved the King's barber from the flames, as well as the cook *pro ore*. As a result of the commission, Person, Testwood, Filmer and Marbeck were tried before a packed jury of Windsor farmers, who knew not the prisoners, rather than from the Windsor townsmen, who were their neighbours. Person, Testwood, and Filmer were condemned, "the judges beholding the prisoners a good while (some with watery eyes)." Marbeck was pardoned.

"On the Saturday morning the other three were had to suffer and all three being bound to the post, a certain young man of Filmer's acquaintance brought him a pot of drink, asking him if he would drink? 'Yea,' quoth Filmer, 'I thank you,' and so encouraging themselves drank one to another. Filmer, rejoicing in the Lord said 'Be merry, my brethren and lift up your hearts to God for after this sharp breakfast I trust we shall have a good dinner in the kingdom of Christ our Lord and Redeemer'; at which words Testwood lifting up his hands and eyes to heaven desired the Lord above to receive his spirit, and Anthony Person pulling the straw unto him laid a good deal thereof on the top of his head, saying 'this is the Lord's hat, now am I dressed like a true soldier of Christ by whose merits only I trust this day to enter into his joy,' and so they yielded up their souls to the Lord with such patience as it was marvellous to the beholders.

"The meaning of Gardiner was after this to have dealt with great personages had not the Lord prevented his cruel purposes. On the Monday after the men were burnt it was determined by the Bishop of Salisbury that Robert Ockham should go to the Bishop of Winchester with the whole process done at the sessions the Thursday before. And also had writings of those that were privily indicted, whereof one of the Queen's men (named Fulke) having knowledge, got to the Court before and told Sir Thomas Cardine and another of the Privy Chamber how all the matter stood. Wherupon Ockham was laid [in wait] for and passing the streets by the Earl of Bedford's lodging[1] was pulled in by the sleeve and kept secret at my Lord Privy Seal's till certain of the Privy Council had perused all his writings; among which they found certain of the Privy Council indicted, with other the King's officers and their wives That is to say Sir Thomas Cardine, Sir Philip Hobby with both their Ladies Master Edmund Harman, Master Tho. Weldon with Snowball and his wife All these they had indicted by the force of the vi articles as aiders, helpers and maintainers of Anthonie Person. And besides them they had indicted of heresy a great number more of the king's true and faithful subjects. Whereof the King's Majesty being certified his grace of his special goodness (without the suit of any man) gave to the aforesaid gentlemen of his Privy Chamber, and other his servants with their wives, his gracious pardon. And as God would have the matter farther known unto his Majesty, as he rode one day a hunting in Guildford Park and saw the Sheriff with Sir Humfrey Foster sitting on their horsebacks together, he called them unto him and asked of them how his laws were executed at Windsor. Then, they beseeching his Grace of pardon, told him plainly that in all their lives, they never sat on matter under his Grace's authority that went so much against their consciences, as the death of these men did, and up and told his Grace so pitiful a tale of the casting away of these poor men that the King turning his horse's head to depart from them, said Alas, poor Innocents.

"After this the King withdrew his favour from the Bishop of Winchester, caused Dr. London and Simons the lawyer and a fierce persecuter of them to be apprehended and brought before the Council and examined upon their oath of allegience, who, denying their wicked fact were found perjured and were judged as perjured persons to wear papers in Windsor, and Ockham to stand upon the pillory in the town of Newbury where he was born. The judgement of all these three was to ride about Windsor, Reading, and Newbury with papers on their heads and their faces turned towards the horses' tails and so to stand upon the pillory in every of these towns for false accusation of these Martyrs and for perjury."[2]

---

[1] Then in Ivy Bridge Lane, the narrow street still leading from the Strand to the Embankment at the west end of the Hotel Cecil.

[2] London, that "stout and filthy Prebendary," as Parker calls him, resigned the Wardenship of New College, Oxford, in 1542, and died in the Fleet Prison a year later. At some time in his career it is said that he did "open penance with two smockes on his shoulders, for Mrs. Thykked and Mrs. Jennynges, the mother and the daughter," so that Parker's epithets are not inappropriate.

MORE GRANTS.

The year began very badly, therefore, for Edmund Harman and his wife Agnes. It ended well. He not only obtained his pardon, unsolicited, but on November 18, 1543:—

> "Edm. Harman, the King's servant and Agnes his wife. Grant in fee to the said Edm. for £198; 6s; 0½d of the hospital of St. John the Evangelist of Burford,[1] Oxon, with lands [specified and tenants named] in Burford, Upton and Astall,[2] Oxon. the manor of Fifehide alias Fyfed, alias Fyffeld, Oxon. and lands [specified and tenants named] in Wydford, Shereburn within the tithing of Risington Magna, Barington,[3] and Risington Parva Glouc. which belonged to the said hospital, except bells, lead and advowsons. Also grant in fee to the said Edm. Harman of lands [specified and tenants named] in Langborowe, Collesbourne Parva and Collesbourne magna Glouc. and in Swaclyff,[4] Oxon which belonged to Bruern[5] mon [astery]."

These grants are dated at Ampthill.

In 1544 Harman had to take his part in the inglorious campaign conducted by the King in person, which ended in the capture of Boulogne after an army of 30,000 Englishmen had landed at Calais to co-operate with the Emperor Charles in waging war against the King of France. Two entries occur mentioning Harman in this connexion. In the one "The Muster book showing what soldiers may be furnished by the gentlemen of England from the King's Council downwards" shows that Edmund Harman was of the Privy Chamber. The other is a record of the Army with the services to be rendered. Under the name of—

---

[1] The hospital was founded in the reign of King John. It consisted of a prior, or master, and several leprous brethren and sisters. The revenue at the time of its dissolution, when it belonged to the Abbey of Keynsham, in Somersetshire, was £15 1s. 10d. per annum.

[2] Astall, no doubt, is Asthall on Akeman Street, the Roman road which connects St. Alban's and Cirencester. It lies halfway between Witney and Burford. The old church and the many-gabled Elizabethan manor house lie close together in the little village. The Asthall Barrow lies about a mile away near the cross roads, where it forms a conspicuous object owing to the clump of trees which grows upon it.

[3] Great and Little Barington lie two miles west of Burford, on the borders of Oxfordshire and Gloucestershire. Agnes Harman married Edmond Bray of Barington, and their descendants lived there until 1725. There is a history of the family, with a plate of Barington Hall, in Atkyns' "History of Gloucesterhire."

[4] Swalcliffe is on the Swale, a tributary of the Cherwell, near Banbury.

[5] Bruern, in Oxfordshire, lies five miles north of Burford. The Cistercian abbey was founded by Nicholas Basset in the year 1147 to the honour of the Blessed Virgin Mary. The yearly revenue at the Dissolution amounted to £124 10s. 10d.

> "The Battle, hereafter ensue the names of such noblemen, knights, gentlemen and others as be appointed to go in person to France, with the King's Majesty in his Grace's Battle with the numbers and sorts of horsemen which each of them bringeth with them. The Privy Chamber. Edm. Harman 4; John Penne 3; Dr. Buttes 4; Archers on foot, Edm. Harman 6; Billmen, Pikes and others Harman 6."

Harman, therefore, had to go to France himself, and was attended by a retinue of four horsemen, six archers and six privates.

The campaign was finished in September, and in October—

> "Edmund Harman of the Household" was "granted Harmondesworth manor and rectory, Middlesex, for forty years in reversion after William Noke and Joan his wife who hold a ten years lease of the same with certain farm stock [described] from St. Mary's College near Winchester."

This grant would have been a bitter pill to his old enemy Dr. London, Warden of New College, who had wished to burn him less than a year before; but the Warden had been safely interned in the Fleet and was already dead.

A few weeks later Harman had permission to sublet some of the lands belonging to Bruern Monastery, for the entry runs:—

> "Edm. Harman to Thos. Predon. Lands in Collesbourne, Glouc. formerly in the tenure of John Mesy and now of Thos. Predon. Bruern mon. Oct. 26th 1544."

The year 1545 again found him busy in adding to his store of Church lands, for "Edmund Harman obtains a 'grant in fee for £317; 15; 8½ of the manor, rectory and the advowson of the vicarage of Thyrrefeld, Berks' which had belonged to St. Alban's monastery, Herts. [He alienated this to Rich. Leys August 25, 1545.] Also a messuage called Banbury Court in the tenure of Robert Dalewood and Anne his wife in St. Helen's parish Abendon, Berks with gardens, &c." He also obtained the advowson of Wydforde Rectory, Glouc. Also "a grant to the said Edmund Harman and Agnes his wife in fee to the said Edmund of the rectory of Burford and the chapel of Fulbroke, Oxon, the advowson of Burford vicarage which had formerly belonged to Keynsham Priory, Somerset."

"A close of pasture called 'le Eightene Acres' in tenure of Sir John Brydges and Thomas Brydges in Fyfelde[1] parish Oxon. abutting on Fyfelde common on the north south and west and upon Bruerne wood on the east." It belonged formerly to Bruern Monastery.

These grants are dated at Greenwich May 26, 1545.

A few months later—viz., on July 8, 1545—

> "Edmund Harman. Grant in fee for £187. 3; 8 of two grain mills called Burford Myllès in Burforde Oxon.; another grain mill called Upton Mylle and a fulling mill in Burford with a meadow called le Holme and land called Pigghill in Burforde, all in tenure of John Jones and a parcel of landes called Warwike's Landes."

Dated at Westminster. The Rev. William C. Emeris, M.A., Vicar of Burford, sends me the following extract from documents of the extinct Corporation of Burford which bears directly on this grant of Burford Mills to Edmund Harman:—

> "A contemporary extract on parchment from the will of Edmund Harman, Esq., deceased, dated March 17, 1576, bequeathing £4 yearly for ever from the Port Mills at Burford, to be collected half-yearly and distributed to poor inhabitants, one moiety at Easter 'in remembrance of the gloryous death, passion and resurrection of my sweete Lord and Saviour Jesus Christ,' and the other moiety on the Monday before Christmas, when those distributing the alms (sixpence to each person) 'shall give in chardge to every person receavinge the said almes, that they and every of them speake good of all men livinge and no evil of them that are departed in the faythe of Christ and that they give prayse and glory to Almighty God for the byrthe of our Lord and Saviour Jesus Christ, the remembrance of whose feast then approacheth and is nighe at hand.'" Mr. Emeris adds: "This charge is still paid, though the property is in other hands."

A pardon is also granted in 1545 "for the acquisition by Harman from Edm. Horne without licence of the manor of Offelde, Oxon and all its appurtenances in Fyfeld parish, Oxon and elsewhere, leased to Robt. Secoll and all lands of Bruern monastery which Secoll farms there." The pardon is dated December 4, 1545.

---

[1] Fyfield lies eight miles from Oxford on the Wantage Road. The church contains the tomb of Lady Catharine Gordon, "the White Rose of Scotland," whom James IV of Scotland gave in marriage to Perkin Warbeck. She was buried in 1527. The manor came into the possession of Sir Thomas White, who lived at Fyfield, and left it to St. John's College. Matthew Arnold celebrated the famous elm known as the Tubney Tree in the lines:—

"Maidens who from the distant hamlets come
To dance around the Fyfield elm in May."

There is also an entry in this year that "The ordinary of the King's Chamber which have bouche of Court and also their diets within the Court are (amongst others) Edm. Harman, John Penne, Barbers." Their names in order of precedence are placed between the grooms of the Privy Chamber and the Robes; their wages are said to be £20.

In 1546 there is "A licence to alienate—Edmund Harman and Agnes his wife to Edmund Sylvester, lands in tenure of Henry Cokker alias Cotteler in Oxfordshire, which belonged to Burford Hospital, and lands in tenure of Simon Wysdom in Rysyngton magna, Glouc. which belonged to that hospital." The licence is dated February 10, 1546.

There are also grants of various small places of profit to others at the request of Edmund Harman, and there is also a notice of "Edmund Harman and the children in his keeping." These were probably the Court pages.

In October, 1546, "Thos. Alsop, the King's Apothecary, supplied perfumes to Mr. Harman to the value of 16d." This entry is of especial interest because it shows the position held by Thomas Alsop, who appears in Holbein's picture with Dr. Butts and Dr. Chambre.

On November 6, 1546: "Edmund Harman the King's servant.—Grant for his services of the lordship and manor, the rectory and the advowson of the vicarage of Teynton, Oxon. formerly belonging to Tewkesbury Abbey, Gloucs." Given at Westminster November 6, 1546.

On December 19, 1546, Harman obtained a place at Court for his brother John.

WILL OF KING HENRY VIII.

King Henry VIII died on January 28, 1546-47. His will, dated at Westminster Palace, December 30, 1546, is witnessed by Harman, who signs second in the order of witnesses. It contains a clause that "in token of special love and favour these . . . servants shall receive as follows, viz. . . . Edmund Harman . . . 200 marks." It was £20 in the draft will.

The last entry I have found about him in the Domestic State Papers is dated 1547, and refers to "15 bags, gloves and other articles used in Hawking delivered between the 10th and 30th. October [1547] to Mr. Harman at Windsor also at Oteland . . . also at Nonsuch . . . also at Westminster."

LATER LIFE.

It is probable that Harman gave up his various offices in London after the death of the King his master. His known religious principles would make his position at Court tolerable for a few years, but it has yet to be ascertained whether the post of King's barber was maintained by the young Edward VI—as regards shaving, at least, it was a sinecure. It is certain that before Mary ascended the throne and his old enemies returned to power, Harman was living securely at Burford, where he had numerous relations on his wife's side, for she was a Sylvester, and the Sylvester monuments are numerous and conspicuous in Burford Church. Here he built a large house on the site of the ancient priory or hospital of St. John the Evangelist, which, as the grant of 1543 states, had formerly belonged to the Abbey of Keynsham in Somersetshire. Its revenues were valued at the Dissolution at £13 6s. 8d. The subsequent history of the manor is interesting. Portions were held after Harman's death by Ann Duchess of Somerset, and Henry Lee (?), of Ditchley. Queen Elizabeth sold it in 1598-99 to Sir John Fortescue, from whom it was purchased by Sir Lawrence Tanfield, Kt. Sir Lawrence rebuilt the house. It descended from him to his grandson Lucius, Lord Falkland, and was sold in 1634 to William Lenthall, Speaker of the Long Parliament. The house as it now stands has an Elizabethan front of two wings, in the centre of which is a carved stone porch with two quaint human figures, believed to belong to the original house built by Harman. They now serve as supporters to the Lenthall arms, which have been inserted between them at a later date. The general appearance of the house, but in a reversed aspect, is well known through Waller's picture of "The Empty Saddle." The latter years of Harman's life, however, seem to have been spent at Taynton, where he had moved as early as 1559, for the register contains the entry "1559. October. Edmunde Bray and Agnes Harman were married on the Munday being the 23rd day of October." He appears, however, to have hoped that he might be buried at Burford, for in 1569 he erected the monument which gave rise to this paper and excavated a large stone vault beneath it, which still remains empty.

DEATH.

Harman died in March, 1576-7; Agnes, his wife, died a few days later on March 30, and they were buried in the south aisle of Taynton Church, where there was a vault which is now filled in. When the floor of the church was repaired in 1812 the coffin-plate of Agnes Harman was found lying loose, and it is now preserved in the chest in Taynton vestry.

I am indebted to Mr. Emeris for the following extracts from the Taynton Parish Register. They all occur on one page, he tells me:—

> "1575. April 2. Buried, Christian Rossell wife of Richard Rossell, sister to Master Edmunde Harman Esq.
> "1576. March 30th. Buried, Agnes Harman the wife of Master Edmunde Harman Esquire of Teinton.
> "1576. Master Edmunde Harman died on the 16th day of March (the date is corrected in the margin to the 19th).
> "1577. Buried, Master Edmund Harman Esquire and Lord of this Manor of Teynton on the 10th. day of April in anno supradicto."

DESCENDANTS.

Nothing is known of fourteen out of the sixteen children. Two daughters married. Agnes, the eldest, married Edward Bray, of Barington, Gloucestershire, who was the son of Reginald, the third brother of Edward, Lord Bray, of Eaton Braye, eight miles west of Luton, in Bedfordshire. She died on November 29, 1594, leaving a son, Giles Bray, who was born in 1580, and a daughter, Anna, who married Edward Ayleworth, of Ayleworth, in 1579. Mary, Harman's younger daughter, married William Johnson, of Leighton Buzzard, in 1574.

BURFORD CENOTAPH.

In the centre of the architrave of the cenotaph (fig. 1, p. 68) in Burford Church are the arms used by Edmund Harman. They are quarterly: 1 and 4, sable, three currycombs argent; 2 and 3 quarterly, per pale indented argent and sable; in the second and third quarters a fleur-de-lys argent over all on a bend sable, three martlets argent. Crest: An arm erect vested argent, cuffed or, holding in the hand proper a haulbert or, handled gules.

The figures round the inscription are interesting. The two upper ones are purely allegorical. The lower ones have head-dresses like those worn by North American Indians, and their hands clutch the stems of plants bearing some tropical fruit.

The following transcription of the inscription upon the monument is copied from a "Collection of Inscriptions in some Oxfordshire Churches," which Mr. Emeris bought a few years ago at one of the sales of Sir Thomas Phillips' books and MSS. Mr. Emeris has kindly compared it with the original in Burford Church, and it is here given as amended :—

> "Edmundus Harmanus Armiger quem Dominus Deus innumeris beneficiis ab ineunte aetate prosequutus est Hoc
> Christianae memoriae monumentum sibi et Agnetae unicae et castissimae conjugi et 16 liberis Deo benedicente ex illa susceptis posuit A.D. 1569."

"Nullus eram, et faciente Deo, sum natus ut essem
Jam nunc de proprio semine rursus ero
Atque die magno quae nunc absumpta putamus
Corpora cernemus surgere tota Deo.

"Pellite corde metum mea membra et audite vosmet
Cum Christo reditura Deo, nam vos gerit ille
Et secum revocat, morbos ridete minaces
Inflictos casus contemnite et atra sepulchra
Despicite exergens quo Christus provocat ite
Christus erit cunctis regnum, lux, vita corona."

CONCLUSION.

I think the time bestowed on these notes about Edmund Harman has been well spent. It shows him to have been an honest, capable, and upright citizen, the trusted servant of a great prince; a Lutheran at a time when it was dangerous to hold Protestant opinions; the possessor of much landed property in different parts of England, some obtained from confiscated estates, some from dissolved religious houses. A good husband, the father of a large family. Saddened no doubt in his later years by many domestic sorrows, he yet lived long enough to see his two surviving children well bestowed in marriage, and his country firmly established in those religious principles for which he had nearly suffered martyrdom.

I desire to thank the Rev. William C. Emeris, Vicar of Burford, for the information he kindly gave to me—a total stranger; and to Mr. Packer, of Burford, for photographing the monument.

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*January* 19, 1916.)

The Rate of Mortality in the British Army 100 Years ago.

By ARNOLD CHAPLIN, M.D., F.R.C.P.

ABOUT two years ago my attention was drawn to this subject on account of the apparent absence of any reliable data on which a comparison could be based between the mortality in the British Army of the present day and that which took place before the dawn of the era of improved hygienic conditions. Since then my leisure hours have been devoted largely to this subject, and I trust that the results will be found interesting enough to be made public.

The labour involved in collecting these statistics will not have been altogether in vain if it be admitted that the exact measure of the advance in sanitary science can hardly be appreciated unless we possess some knowledge of the conditions existing in years long since gone. From the standpoint of history, however, there can be no doubt concerning the importance of this subject, particularly at the present time, for, while to-day our nation is fighting and dying for its existence, it is a satisfaction to know that our forefathers cheerfully submitted to a heavy blood-tax, even in times of peace, in order to acquire and hold this mighty realm.

The literature of this subject is somewhat scanty, and few investigators appear to have been attracted to this question. The first serious attempt at estimating the rate of mortality in the Army was made by Colonel Tulloch and Assistant-Surgeon Balfour in their report to Parliament in 1838. In this admirable report they dealt with the mortality between the years 1816-36, and since they were accomplished medical men, their work has an added value on account of the light they throw on the causation of sickness and death. With the exceptions of Sir John Pringle, Sir Gilbert Blane, and Dr. John Davy, Tulloch and Balfour were the first to draw attention to this subject from a statistical standpoint. The only criticism that can be advanced concerning their work is that, in some instances, they offer for comparison the mortality results of two or three years only with those extending over twenty years. But Tulloch and Balfour could never have produced their valuable report had not the material been carefully collected under the able superintendence of the Medical Inspector-General of the Army, Sir James McGrigor. Indeed, it is due to him alone that we possess such a complete series of statistics bearing on the mortality in the Army.

The subject of mortality in the British Army has also been dealt with in a most able and comprehensive manner by actuaries. Messrs. Ackland, Smee, and James McLauchlan have communicated papers to the *Journal of the Institute of Actuaries* (vol. xxxiv), but the years investigated belong to a much later period than those under review in the present paper. In 1857, W. B. Hodge published in the same journal (vol. vii) a series of papers concerning the mortality in the Army during the Napoleonic and Crimean Wars, which exhibit a profound and wide acquaintance with the historical side of the subject, in addition to consummate statistical ability. Of course the work of famous actuaries in this field is far above the criticism of a mere layman, still, if one may be permitted, one would say, after a perusal of these papers, that, with the exception of those by Hodge, they fail somewhat on account of insufficient knowledge of historical facts and hygienic conditions on the part of their authors.

In pursuit of this investigation of the rate of mortality in the British Army 100 years ago, I have taken a series of five years, from 1817 to 1821 inclusive. These years have been adopted for two reasons: Firstly, because they represent a period when the Empire was at peace, and therefore the results will be less likely to be vitiated by deaths from disease and exhaustion which always swell the death-rate after prolonged campaigns; secondly, because that period may be fairly claimed to embrace the last few years antecedent to the dawn of modern clinical methods and all that they entailed. Deaths caused as the result of battles have been excluded, and the returns, therefore, represent the rate of mortality from disease alone. In order also to arrive at the death-rate in the Army under the most unfavourable sanitary conditions, I have investigated the returns relating to the rank and file alone. Deaths occurring amongst officers have been excluded. Finally, the figures include not only troops in the British Isles, but also those quartered in the British possessions all over the world. It has been possible, therefore, to arrive at a comparatively comprehensive estimate of the rate of mortality throughout the British Empire 100 years ago.

The documents consulted are to be found in the "War Office" series of the Archives in the Public Record Office, and among them of chief importance are: (1) "The Monthly Returns," W.O. 17, which give full information concerning the "strength" and deaths per mensem occurring in the British Army; (2) "The Casualty Returns," which often furnish more precise details concerning the deaths of soldiers; (3) "The Muster Rolls of Regiments," which give the numbers of sick in each month. Of the value, the extent, and the accuracy of these records it is impossible to speak too highly, and probably no nation possesses such a well-arranged and complete set of papers as exists in the "War Office" series in the Record Office. The Archives Nationales at Paris may, in certain particulars, claim precedence, but it may be doubted whether anything can approach the "War Office" series in completeness and system. Indeed, it is no exaggeration to assert that if the name and regiment of any humble soldier serving his King from 1750 to the present time be given, his whole record while in the Army can be traced by reference to this series. The "Casualty Returns" are also of considerable value, for they contain the wills of those who died while serving, and they give the place and nature of death. These wills are not without pathetic interest, written as they are on faded pieces of paper, in far-off lands. Most of them begin with the stereotyped formula, "In the name of God, Amen, I, John Jones, being about to meet my Maker," and then follow simple directions as to the disposal of the small effects, such as a belt or a pocket-knife. Often attached to the will is a scrawled and soiled document, in which the wife or other heir of the deceased acknowledges the receipt of, it may be, 3s. 4d., the value of the effects, and thus the accounts of a humble but worthy maker of Empire are finally settled.

But however great the value that must be attached to the War Office records, in one important respect they lack completeness. There are no documents which deal with the diseases which caused the mortality. Practically nothing is given concerning the incidence of disease, nor of the causes and symptoms. Epidemics frequently attacked regiments and swept off hundreds, but one may search in vain in these records for such information. We can appeal, therefore, only to figures, and the actual deaths they represent, when we state the rate of mortality in the British Army 100 years ago.

But even with these bare figures before us, the tale they unfold is, in many respects, surprising. Last July we were told that, as a result of one year's fighting in defence of our liberties, we had to mourn the loss of 60,000 brave men, out of a total of certainly not less than one million engaged, or, in other words, our losses in killed had amounted to 60 per 1,000. I do not, of course, contend that the whole of the million had been exposed to the risk of death in battle for a whole year, but the illustration will serve. Terrible, however, as the slaughter has been, it is not worse than the havoc wrought by disease in the British regiments quartered in various parts of the Empire 100 years ago when no fighting took place. Verily, in a sinister sense, it may be said that "peace hath her victories." This statement, that the rate of mortality of 60 per 1,000 in the present War is not worse than that produced by the ravages by disease a century ago, will not be considered an exaggeration when I state that the average annual death-rate in white troops quartered in Jamaica was 185 per 1,000, in West Africa 360 per 1,000, and in India 87 per 1,000. Let us therefore draw what poor comfort we can from the remembrance of the fact that, however much we may deplore the wastage of valuable life at the present time, our forefathers were called upon to bear an equal blood-tax in disease alone.

It is by statistical comparisons alone that an estimate can be made of the advances that have taken place in the domains of medical and sanitary science in the British Army, and the primary object is to show how enormous those advances have been. A hundred years ago disease was the all-powerful enemy; now the position is reversed, and disease no longer plays a prominent part in the conditions which control the activities of a striking force. At the present time death-dealing weapons have usurped the position of disease, and by their agency fighting forces are weakened and destroyed. What were the chief causes responsible for the heavy mortality from disease in the Army 100 years ago? They may be generalized under three headings: (1) Ignorance of the causation of disease; (2) neglect of the study of conditions necessary for health; and (3) improper clothing and food of the Army in various conditions of climate. To these a fourth factor may be added—viz., the mortality which occurred as the result of being admitted to the military hospitals. Many writers have adverted to this, and, strange as it may seem, the risk of the death of a patient was largely enhanced by removing him to the wretched hovels which did duty as hospitals. Almost invariably the disease took a serious turn, and if death did not ensue from the original complaint, the military hospital contained sufficient infection to implant another fatal disease in its place. In tropical climates soldiers, encumbered by their heavy accoutrements and uniforms, undertook long marches in the burning sun, and at the end of their journey were allowed to slake their thirst with copious draughts of strong ale. The food they consumed was ill-suited to the work they had to perform and the climates in which they lived. At home, typhus fever and small-pox were liable to break out at any time and to decimate a regiment. Chest complaints and venereal diseases were very prevalent, and, from officer down to private, insobriety was rampant. Abroad, in the Tropics, the troops suffered from frequent outbreaks of malaria, plague, yellow fever, and cholera, and for want of proper head-gear sunstroke was common. One has only to read the memoirs and autobiographies of officers and surgeons of those days to understand the terrible havoc made by these diseases.

Having now explained the design of this investigation, and the disadvantageous conditions which were responsible for the high death-rate in the Army 100 years ago, attention may be drawn to some of the most important features which come to light from a survey of the mortality in the various quarters of the world in which the troops were stationed. In the first place, however, it will be necessary to establish as an index the rate of mortality in the Army while quartered at home. For this purpose the returns of the troops stationed in Scotland and those of the Foot Guards on service in London have been used. From these two sources of information it is found that the annual rate of mortality from 1817 to 1821 was 15 per 1,000 in the case of troops in Scotland, and 19 per 1,000 in the case of the Foot Guards in London. These figures may be regarded as the two extremes so far as Great Britain is concerned, and no great error will be committed in stating that about 17 soldiers out of every 1,000 quartered in Great Britain died each year from 1817 to 1821. One would have supposed that this rate of mortality of 17 per 1,000, occurring in a picked class of men, would compare favourably with that of the rest of the male population of the same ages and subjected to selection. But this is not the case, for Ansell's tables of the mortality among members of the friendly societies during the years 1823 to 1827 show that the mean rate of mortality between the ages of 20 and 40 was 11 per 1,000, a rate very much better than that of the Army.

Having, therefore, established the death-rate in the Army under "home" conditions at 17 per 1,000, we may now consider how that death-rate varied in the diverse climates of the Dependencies of the British Empire. Before proceeding to that subject, however, it may be stated that the death-rate in the Army in Great Britain has fallen from 17 per 1,000 in 1817-21 to 2·6 per 1,000 in 1907-11, a truly wonderful achievement to place to the credit of Public Health. A hundred years ago, in every Colony of the Empire, with the exceptions of Gibraltar, Canada and the Cape, the death-rate in the Army was far higher than in Great Britain, and in some places the price paid in deaths may be described as appalling. But mortality alone was not always the cause of ineffectiveness in the ranks of the Army, for sickness of an incapacitating kind frequently broke out and destroyed its efficiency. A prominent case in point is the well-known and ill-fated Walcheren Expedition of 1809. The medical history of this undertaking, as unfolded in the returns in the Record Office, is probably the most striking illustration extant of the way in which sickness alone may literally "wipe out" an army of considerable size. The whole story of the expedition reads more like a romance than a sober account of mortality and sickness. The Army was away for little more than three months, and comparatively little fighting took place, but the scene of its operations was laid in the swampy Islands of Walcheren and Beveland, in the mouth of the Scheldt. The health of the troops was excellent for a time, but early in September a miasmal fever seized upon the Army and wrought truly appalling havoc. In the middle of September it was decided to reduce the original force of 38,802 men to 16,386, by sending home twenty battalions, but the men composing them were so weak that they were incapable of marching. When, in November, after three months' occupation of this fever-stricken swamp, the poor remnants of the Army were finally withdrawn, 5,671 only could be returned as effective and fit for marching. It was not death from the bullets of the enemy that caused these terrible ravages, nor was it even deaths from sickness, for during the three months that the Army remained in the mouth of the Scheldt 2,000 only died, though ultimately, of course, the mortality must have been severe. The medical arrangements at the outset were excellent, but disease soon swept off the medical staff, and it was not until Sir James McGrigor took charge that fair medical efficiency could be re-established. Until the present War it was safe to assert that the records of no military undertaking could show a more terrible tale of disaster produced by sickness alone, but now competent authorities aver that Gallipoli will share the doubtful honours with Walcheren.

In India the mortality among the British troops was very high 100 years ago, the mean annual rate being about 87 per 1,000, and it was not until about sixty years ago that an appreciable reduction could be shown in that rate. Since then, however, the rate has steadily diminished, until in the quinquennium 1907-11 it was the surprisingly low one of 6·7 per 1,000. Few facts can attest more strongly the wonderful conquest sanitary science has obtained over the conditions militating against good health in the Tropics. Malaria, plague, cholera, dysentery, and the effects of the sun were responsible for this high death-rate 100 years ago, and although these agencies are still at work, the defence set up by increased knowledge and improved methods has rendered white troops practically immune from their attacks. Indeed, it may now almost be said that dysentery and enteric fever are the only two conditions which have a pronounced effect on the mortality of white troops in the Tropics.

The price paid by the British in blood to acquire, hold, and develop the Indian Empire has been a terribly heavy one; exactly how heavy can probably never be known. Ever since the days when Job Charnock with his handful of followers clambered up the steep mudbank on the Hugli, which was eventually to become Calcutta, the toll of human sacrifice and British life is not to be computed in words. Not only have tens of thousands of British soldiers given their lives, but countless numbers of civilians have met early deaths in the struggle for British supremacy in India. The graves of these heroes, all ignorant of the great part they were playing, are to be found dotted all over the Indian Empire. But for the correct and complete registers of deaths in India kept at the India Office, and a curious and rare book entitled "The Bengal Obituary," published in 1851 by a firm of undertakers in Calcutta, in which the inscriptions found on tombstones are recorded, we should be ignorant of the price Britain has paid. In these records it is astonishing to observe the early age at which most of the men died. Promotion and rank had to come to men early if it came at all.

West Africa, and particularly Sierra Leone, was fully entitled to the sinister appellation, "The White Man's Grave," for, 100 years ago, the mortality, even in favourable years, was as high as 362 per 1,000. In the five years from 1907 to 1911 the mortality had fallen to 11 per 1,000, a truly marvellous result, and there are signs that future years will show still further improvement.

The various stations in the West Indies were all more or less unhealthy for British troops quartered there 100 years ago. In the case of Jamaica, the mean annual mortality-rate was the enormous one of 185 per 1,000; while in Bermuda, a comparatively healthy locality, it was 75 per 1,000. The returns for the period 1907-11 show the great improvement that has taken place, for in Jamaica the death-rate was 10 per 1,000 and in Bermuda 3 per 1,000. Throughout the West Indies yellow fever was very prevalent, and accounted for a considerable number of deaths. In addition, Jamaica manufactured large quantities of rum, and the insobriety of the troops caused much illness. The most unhealthy season of the year in Jamaica was from September to January, and by far the largest number of deaths occurred during that period. The climate of the island also proved to be very deadly to troops newly arrived, and in the case of the 50th Foot, no fewer than 248 died in the first ten months of residence out of a total strength of 513.

Malta was a healthy station when judged by the standards of those days, for the death-rate among the troops was only 25 per 1,000. Canada and Gibraltar showed no variation from the death-rate obtaining in the United Kingdom, and the Cape was able to claim the lowest mortality-rate of all, being only 12 per 1,000.

It will be seen, therefore, that enormous advances have been made during the last 100 years in the science of military hygiene, and while in the past disease swept off far more soldiers than the accident of battle, now our method is so near perfection that death from disease is almost a negligible quantity. A perusal of the two tables which accompany this article will give an idea of the advance that has been made.

A COMPARATIVE TABLE SHOWING THE MORTALITY PER 1,000 AT DIFFERENT PERIODS.

Place	1817-21	1876-85	1907-11
Great Britain	17	—	2·6
India	87	16	6·7
Gibraltar	18	7	3·4
Canada	19	5	—
Jamaica	185	16	9·9
Bermuda	75	7	2·9
Ceylon	111	14	7·4
South Africa	12	—	3·8
West Africa	362	—	11·9
Malta	25	—	2·8

A Table showing the Mean Annual Strength, Mean Annual Deaths, and Mean Annual Mortality per 1,000 in the British Army while quartered at various Stations, 1817-21.

Station	Mean annual strength	Mean annual deaths	Mean annual mortality per 1,000
London	3,252	63	19 (approx.)
North Britain	3,040	47	15 ,,
Gibraltar	3,266	63	18 ,,
Malta	1,832	46	25 ,,
Ionian Islands	2,941	103	35 ,,
All India	18,195	1,591	87 ,,
Bengal	5,823	465	79 ,,
Madras	7,344	578	78 ,,
Bombay	2,874	279	97 ,,
Ceylon	2,153	268	111 ,,
Jamaica	1,727	331	185 ,,
Bermuda	372	28	75 ,,
The Cape	2,113	26	12 ,,
West Africa	97	36	362 ,,
Canada	3,529	68	19 ,,
St. Helena	1,113	44	39 ,,

In conclusion, it may be stated that the figures upon which this investigation has been based have been submitted to a distinguished actuary. He has looked through them, and has expressed the opinion that no serious statistical error has been committed.

BIBLIOGRAPHY.

The volumes consulted in the Public Record Office are the "Monthly Returns" in the War Office, Series 17 (*W.O.* 17), *and the particular volumes referring to troops quartered in the various Dependencies are as follows:—*

London. W.O. 17. Vols. 315, 335, 341, 349.
North Britain. W.O. 17. Vols. 1,047-51.
West Africa. W.O. 17. Vols. 1,169-71.
Bengal. W.O. 17. Vols. 1,324-28.
Bermuda. W.O. 17. Vols. 1,381-85.
Bombay. W.O. 17. Vols. 1,437-41.
The Cape. W.O. 17. Vols. 1,593-1602.
Canada. W.O. 17. Vols. 1,521-25.
Ceylon. W.O. 17. Vols. 1,656-60.
Gibraltar. W.O. 17. Vols. 1,803-07.
Jamaica. W.O. 17. Vols. 2,007-11.
Madras. W.O. 17. Vols. 2,068-72.
Walcheren. W.O. 17. Vol. 2,479.

Professor SIMPSON: The Chairman referred to the General's opinion that the situation of Sierra Leone, or Freetown, was naturally healthy. Although it may seem paradoxical, after hearing of the terrible mortality there, I am not at all sure that the General was not right. Sierra Leone is in a beautiful situation, and encircled by hills, forming healthy sites for houses, and the Europeans now living there enjoy generally very good health; and I am convinced that with a steady advancement in its sanitation it will become a naturally healthy station, as much as any tropical station is to Europeans. Freetown, as its name suggests, was established as a place of safety to which the slave ships captured by the British Navy were brought, and where the slaves were landed and set free. And it was mainly because of the recurring epidemics of yellow fever and the severity of malarial fever owing to the neglect of early treatment, the close proximity as a general rule of the dwellings of Europeans and natives, and the very vague notion then existing as to the means of preventing malaria, that Freetown, usually called Sierra Leone, acquired its evil reputation. It was the same in the West Indies. Yellow fever often prevailed, and created much havoc among our soldiers and sailors, but there, as in Sierra Leone, the sanitation was bad. Many of the barracks were built on sites that were swampy or were near swamps. The cubic space allowed for each soldier was only 250 cubic feet, the latrines were of a primitive kind and not kept very clean, the soldiers' clothes were unsuited to the climate, and it was the same with the food; the soldiers took insufficient exercise, and ate and drank too much. A long time elapsed before it was recognized that European habits of life were not suitable in the Tropics, and especially when, as frequently happened, they were continued in an exaggerated form. The most common of these was excessive drinking, and there are in some of the mortality records in these early days in the East not unfrequently a very candid statement of the cause of death as being due to drink. Most of the causes, however, were attributed to climate. In the old days in Calcutta the dining hour was early in the afternoon, and the meal so sumptuous and prolonged that many a quarrel had its origin then. Again, as regards dress, in old engravings and pictures soldiers will be seen wearing ordinary shakos, with tight red coats and stock collars; and men are to be seen riding in the famous Red Row of Calcutta in high hats and evening dress coats. With a greater appreciation of the necessity of adapting habits and customs to the new environment, the personal hygiene of the European in the Tropics has gradually improved, and probably more rapidly than that of general sanitation in the community. Still both have been at work, and the result is very remarkable as affecting the health of the European.

As regards the observations of Dr. Arnold Chaplin on the health of armies 100 years ago, it may be interesting to recall the observations on the diseases of the Army, by Dr. Pringle, some seventy years earlier. Dr. Pringle, afterwards Sir John Pringle and President of the Royal Society, was the first English military physician who described the diseases occurring during wartime, and their causes, with the object of their prevention. The campaigns of

1742-45 in Flanders and Germany, which included, among other battles, that of Dettingen, varied considerably in the amount of sickness among the troops. In the first two years there was most sickness, and it consisted generally of dysentery, intermittent and remittent fevers, bilious remittent fever with jaundice, jaundice without fever, pleurisies and pneumonias, and influenza, which then was passing in an epidemic over Europe. Pringle noticed that those troops encamped in low ground or quartered in damp barracks with no drains were more unhealthy than those more fortunately situated, and that dysenteries abated so remarkably at times that the change could only be imputed to the troops removing from the infectious privies the foul straw and the filth of a long encampment. He also recognized that when the men were well fed they were healthy. There was only one epidemic of importance in the campaign of 1743, and that was in the village of Feckensheim, which was taken up as a hospital, and where a large number of sick from dysentery were crowded with the wounded from the field of battle. The result was disastrous. Both dysentery and hospital fever acquired such intensity of virulence that patients, apothecaries, nurses, and other attendants of the hospital were attacked, and most of the inhabitants of the village. The hospital lost nearly half of its patients and the inhabitants of the village were almost destroyed. Reading these accounts it appears that much of the mortality in these old campaigns was due to the crowded condition of the hospitals rather than to the condition in the camps, though that also was an important factor. In 1744 and 1745 the Army enjoyed comparatively good health. In the campaign of 1744 the death-rate from sickness did not exceed 15 per 1,000, and in the campaign of 1745 it was only 10 per 1,000. Unfortunately, the death-rate is not given for the first two years.

We have no available statistics for the present campaign in Flanders, so that no comparison can be made with the campaigns of 1742-45. We have only the published statistics of the Gallipoli expedition, in which the sick-rate was 49 per cent. of the wounded; but what was the strength of the Army which gave 96,000 sick in six months and what was the mortality among these we do not know. We do know, however, that for the Army as a whole the wastage from sickness has been very great. Mr. Asquith told us it was enormous, and Mr. Tennant was more precise, and stated in the House of Commons that it required 1·8 men to be in reserve to replace one man at the front, and that the wastage was 15 per cent. per month, which means 180 per cent. per year. The total wastage in killed, wounded, and missing was approximately 528,000 men in sixteen months, or approximately 40 per cent. per annum on a million men, or less if Mr. Asquith's statement of 1½ million at the front is taken. It would therefore appear that three or more men are disabled from sickness for each casualty in the field, which, if correct, is a greater percentage than at Gallipoli. How this ratio compares with other campaigns it will be interesting to learn later when the statistics are available.

(*January* 19, 1916.)

Joshua Ward, 1685-1761.

By H. Selfe Bennett, M.B.

It is not always easy to attain the felicity of him who discovers the causes of things, although in this frequent hazard of happiness or science of ætiology, the patient is oft-times far more confidently successful than his doctor.

On this occasion you may have the full assurance of faith that the origin of the present discourse is due to my success in enlisting the interest of the Secretary of this Historical Section of the Royal Society of Medicine in a print which has been hanging in my room for many years. It is a line engraving from an oil painting, but the locale of the original picture is unknown.

Pictorial representation of " the ills that flesh is heir to " may be thought by the uninitiated to be both uncommon and unpleasing. It is true that pictures of disease are " caviare to the general," but a fuller knowledge reveals the fact that artists of high standing have not disdained to depict subjects, such as the healing of the sick and the dissection of the cadaver, which to the multitude are gruesomely distasteful. A visit to the Wellcome Museum will show how often medicine has furnished serious matter for art, whilst the doctor and the quack have an evident attraction for the satirist.

You will remember that in May, 1911, the editor of the *Journal of the British Medical Association* issued a special number which was devoted to the subject of Quackery.

If any justification were required in ordinary times for the present essay, it will be found in that illustrious precedent, wherein distinguished members of our profession devoted themselves to exposure of the multiform varieties of quackery, and short histories were given of many notorious quacks.

This number of the *Journal* contained numerous portraits and other illustrations, including a reproduction in colours of a sketch by Gillray of the celebrated Elisha Perkins, with his "Metallic Tractors," operating upon the bulbous nose of a bibulous patient.

Amongst these portraits of unlicensed practitioners of the noble art of death defence there were two of Joshua Ward, which had been supplied to the editor from my collection for the purpose of reproduction. One of these is contained in the well-known picture by Hogarth, originally entitled "The Undertakers," but afterwards subscribed as "A Consultation of Physicians"; the second and scarcer portrait is that previously referred to as being the cause of this paper.

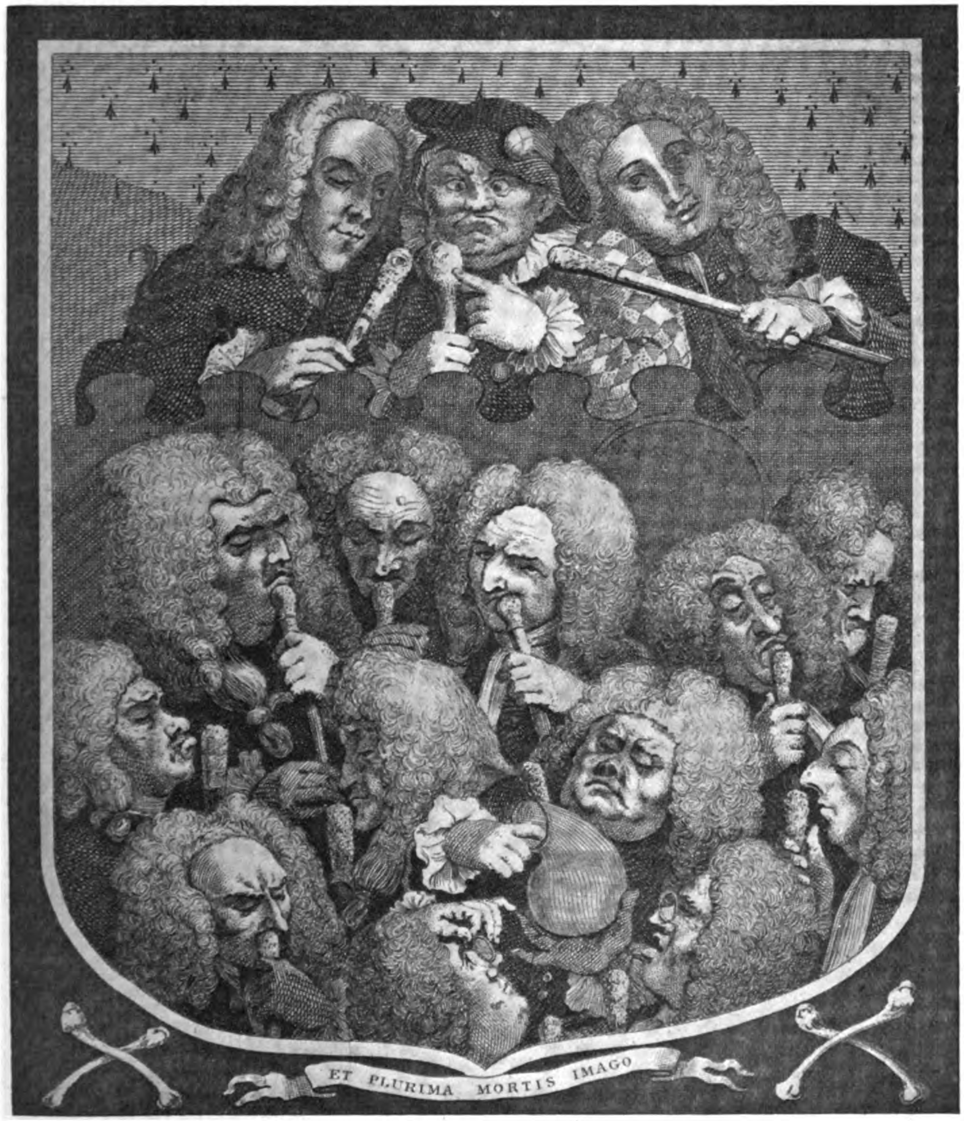


PLATE I. [*Hogarth.*

Hogarth's plate—in which the legitimate are degraded whilst bastards hold pride of place and sit in the exalted seats of the mighty—shows Ward in a conspicuous position to the left of Mrs. Mapp, the bone-setter, who has Chevalier Taylor, the eye doctor, on her right; the following description by the artist and engraver of the "Arms of the Undertaker" may appeal to those who are heraldically minded, although it is to be supposed that Hogarth was poking fun at a science with which he had but small acquaintance:—

> "The company of Undertakers beareth Sable, an Urinal proper between twelve Quack heads of the second and twelve caneheads Or, Consultant—on a Chief, Nebule, Ermine, one complete doctor issuant checkle sustaining in his right hand a baton of the second [Mrs. Mapp, the 'famous masculine woman,' the bone-setter or Shape Mistress]. On his dexter and sinister sides two demi-doctors issuant of the second, and two canes issuant of the third; the first having an eye couchant [Chevalier Taylor's cane] towards the dexter side of the escutcheon, the second faced per pale proper and Gules guardant, with this motto
>
> 'Et plurima mortis imago.'"

The second of these two demi-doctors was Joshua Ward, the subject of this paper, successful empiric, Member of Parliament for Marlborough from January to May, 1717, but unseated on the sufficient ground that he had not obtained a single valid vote; who "flourished," to use an old but appropriate expression, in those progressive days which saw the parting asunder of the surgeons from the barbers. He was the proprietor of the famous drop and pills, variegated in blue, red, and purple colours, and was commonly called "Spot Ward," on account of a claret stain or nævus on the left side of his face, which Hogarth has emphasized by the shading in his print.

The other and less-known portrait of Ward, in which I wish to engage your interest, was also reproduced in the special number of the *British Medical Journal.* It was sent to the editor with this note:—

> "The engraving from which this excellent photograph was taken has been in my possession for some years. It had been despitefully used, folded down the centre, cracked, and the margin cut off. Subsequently, however, it had been carefully laid down, pressed, and mounted on toned paper, with a pencil inscription below. This reads: Nat. 1685. Joshua Ward, *M.D.* Ob. 1761.' There is no doubt as to the truth of this statement (except as regards the degree); it is evidenced by the subject of the painting and the portly presence of the Doctor, who was 'a fine figure of a man,' as shown in other undoubted portraits. Austin Dobson, who is the latest authority on Hogarth, makes no mention of such a painting, and is somewhat scornful as to 'owners of pictures

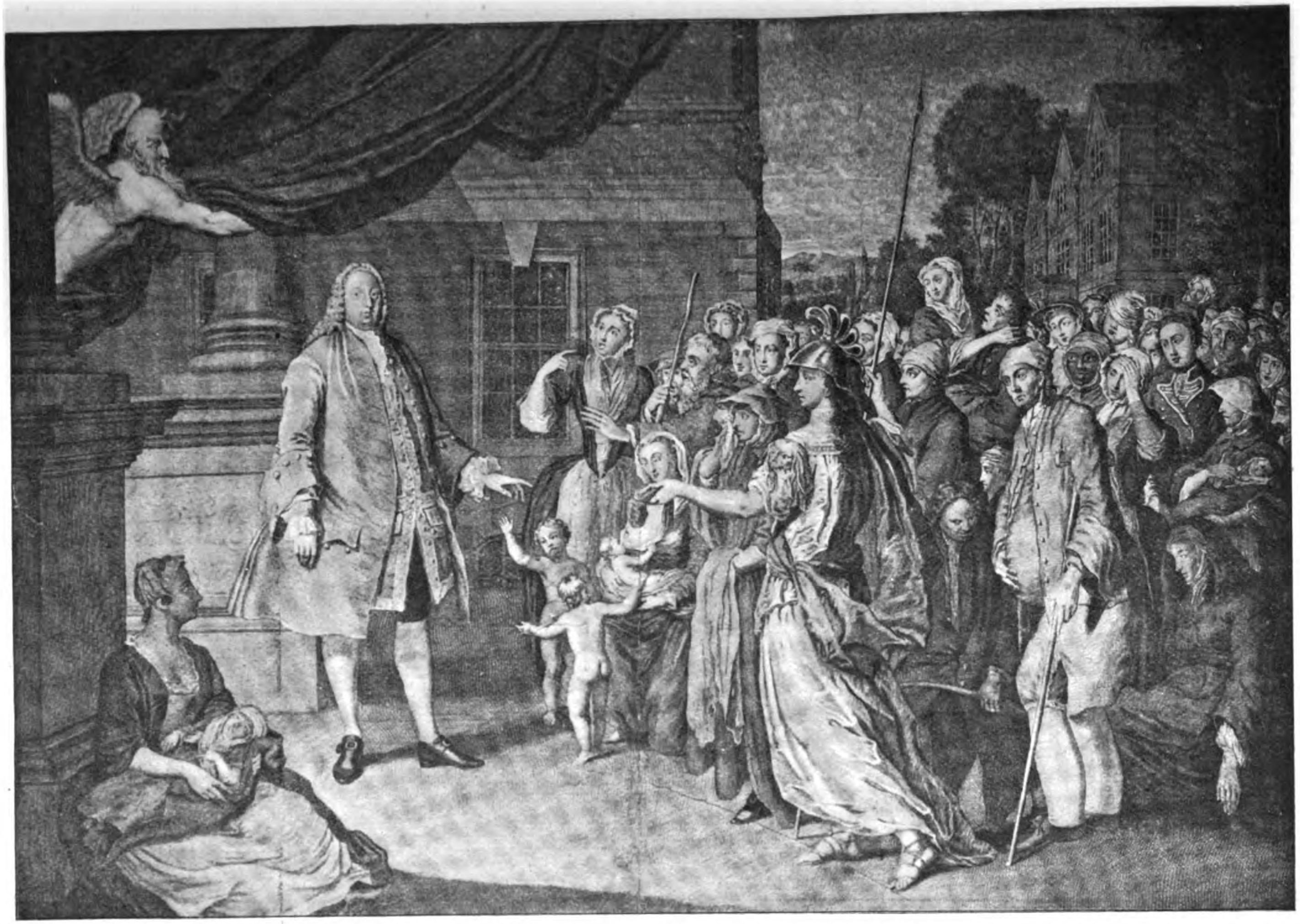


Plate II.

Nat. 1685. Joshua Ward, M.D. Ob. 1761.

Copy of engraving presented to the Royal Society of Medicine by the author.

ascribed to Hogarth.' The draughtsmanship is, however, 'signed all over,' and it may almost be said that no one else save Hogarth (who painted Ward more than once) could have been the artist, although history is so far silent as to the engraver."

When I thus dogmatically attributed the painting to Hogarth I did not think that I should live to be made to comply against my will with the dictum that the real artist was one Thomas Bardwell (d. 1780?), for I confess myself obstinately inclined to be "of the same opinion still." This obstinacy is confirmed by the judgment of some of my friends, artists and others, notably by that of Dr. Leonard Mark, author of "Art and Medicine," who drew my attention to the similarity of the figure of the dropsical man in this picture to that in the painting of "The Pool of Bethesda" on the staircase at St. Bartholomew's Hospital. In both pictures he is a tall figure who occupies the right foreground of the composition, and supports his abdomen with his right hand. It is sad to confess that the weight of authority is against this ascription to Hogarth by reason of a copy of the engraving, with full margin and inscription, in the British Museum. The "Catalogue of Engraved British Portraits" describes it thus: "Joshua Ward, quack doctor, 1685-1761. Joshua Ward standing, with Britannia introducing to him a crowd of sick persons and offering him a purse—10 lines below ''Tis thou O gen'rous Ward,' etc., published 1749. Painted by Thos. Bardwell: Engraver *Anon.*[1] 15 × 22½ in." The date shows it to have been published in Hogarth's lifetime, for he lived till 1764. The verses run as follows:—

" 'Tis thou, O gen'rous Ward, thrice bless'd we see
Crouded with those that seek thy Charity.
The Poor distress'd, the sick, the lame, ye blind,
Here seek relief from thee relief they find.
If volumes have been wrote on Faith and Hope,
Sure Charity deserves a greater scope.
O, happy Ward! thy charity's so great.
It wants not words to make it more compleate
The multitudes that daily croud thy door
Loudly proclaim thee Father of the Poor."

---

[1] Evans's "Catalogue of Prints" says the portrait is "scarce," values it at 10s., and ascribes the engraving to Baron (Bernard, d. 1762), who reproduced works by Vandyke, Kneller, Rubens, and other artists, including Hogarth, for his name is attached to some of the series "Marriage à la Mode."

Below this we are given the following interpretation of the artist's dream:—

> "Britannia comes at the Head of the Poor and offers a purse of gold to Mr. Ward, who points to give it to Charity, setting at her feet. Time draws a curtain in anger to see who it is that stops the passage of the croud."

By me this design is not so read, but this is an early description thereof.

Now, although Bardwell's name appears in that British Valhalla, the "Dictionary of National Biography," he is not spoken of in such complimentary terms as would be justifiable in the case of an artist who could thus rival Hogarth in character-painting and in the drawing and grouping of a crowd. The entry against his name runs as follows: "Portrait Painter; well-known copyist; published 'Practice of Painting and Perspective made easy,'" 1756. When search was made for other specimens of his handicraft, practically nothing was found which in any way resembled either in composition or draughtsmanship the picture shown to you. It is surely curious that this "*well-known copyist*" should not have left other work to posterity and thus have redeemed his name from unjustifiable obscurity, for it will be admitted that "the crowd of sick persons" in this picture represents very successfully many various types; it shows accurate observation and careful delineation. On the other hand, in this graphic contrast of health and disease there are many Hogarthian touches—e.g., the figures of the buxom mother in the left foreground and the saddened son of Mars (? worsted in war by Venus) in the centre of the crowd to the right of the picture, whilst the whole balance and scheme betoken an artist of no mean merit, whose talent would surely not have been revealed by so solitary an example.

A writer in "The Connoisseur's Repertory; or a Biographical History of Painters," by Thomas Dodd, vol. vi (vol. i published 1824), speaking of Thomas Bardwell, is still more contemptuous of his skill, for we read he was—

> "A painter of portraits, *of ordinary talent* [the emphasis is mine], who practised in London and in local parts [*sic*] of the country, from the date of 1740 to 1770; whatever his merits were as a painter, he thought himself qualified to give instructions in the practical part of the art, and published a 4to pamphlet of 64 pp. entitled 'The Practice of Painting and Perspective made Easy.'"

The British Museum catalogue contains notice of yet another portrait of Ward—viz., a mezzotint by J. Faber, after Loving (12½ in. × 9⅞ in.);

of this, however, a photograph has not been obtained. Judging by the number of copies extant of either of these prints, the time and labour expended on them cannot have reaped great reward unless the subject himself paid the artists handsomely.

Here endeth the first or pictorial part of this discourse, and here beginneth the second or personal chapter.

The chief source of information about Ward, the man, his practice, his pill and his drop, is a small octavo volume (pp. 114), written by one Joseph Clutton, an apothecary, published in 1736, and sold at the modest price of 1s.; there is a copy of this book in the Library of the Royal College of Physicians, and another in the Corporation Library at the Guildhall. The title-page, as was customary 180 years ago, is more descriptive of the contents than modern authors think necessary, or, perhaps, desirable; fully transcribed, it reads as follows:—

A True and Candid
RELATION
OF THE
GOOD AND BAD EFFECTS
OF
JOSHUA WARD'S
PILL & DROP
Exhibited in Sixty-Eight Cases;

Quotations from the Writings of Learned Physicians concerning
ARSENICK: Some Cases of Persons who have taken
it; and Experiments to shew what are the component
Principles of *these Pills*. Introduced with occurrences
shewing the Rise and Progress of this Controversy.
The whole being an Essay to discover how far the
Random Practice of Physic is really useful.

By JOS. CLUTTON.

LONDON:
Printed for the author; and sold by J. W. Wilford behind the
Chapter House in St. Paul's Churchyard.
MDCCXXXVI.

There is great virtue in that word "random"; it seems so expressive of haphazard irregularity and very appropriate to the occasion. You will probably agree that "random practice of physic" is a good and apt description of quackery. In this "true and candid relation" the "good effects" are far to seek.

The preface opens abruptly with this statement: "There is a person in Town who came from abroad about the year 1733, and gaining Favour with persons of Rank and Quality, spread his medicines in eight or nine months around this Island, in so much that he acknowledges to have administered them to Twenty thousand Persons within this small compass of Time." (Pref., pp. i and ii). Whether the author is speaking "sarcastic" or accepted the statistics (as we moderns do) on the authority of their compiler does not clearly appear.

After the preface there is a dedication to Caroline, wife of King George II, who had a greater appreciation of books than her husband, whose mind was averse to all "Kultur," German or other. Her Most Gracious Majesty is often differentiated from a later (uncrowned) Queen Caroline by the honourable affix of "Good."

The body of the book is divided into sections. Section I contains "Some account of the manner in which the Author first came acquainted with the Nature and Effects of these famous medicines." He tells us that when congratulating a patient "newly returned from France" on her improved appearance, she said: "it was entirely owing to Mr. Ward's drop, which she had taken only twice; a pleasant medicine, being one Drop given in a Spoonful of Sack," a dose which recalls Sir John Falstaff's allowance of bread.

> After further experience of "three or four of my own acquaintance, two of whom had like to have been killed, and apply'd to me for assistance; . . . I thought it my duty to scrutinise pretty closely into such a dangerous medicine, which had gained such a character. While I was in this pursuit, I was suddenly surprised with the two following letters in the *Daily Advertiser*, dated November 15th, 1734."

The first of these letters, from Joshua Ward himself, begs the editor to insert the second, which was addressed to "Mr. Ward, at his House in Pall Mall," by so great a man as the Lord Chief Baron Reynolds, who dates from "Red-Lyon-Square." The eminent lawyer vouches for "the surprising cure your Drops have lately done on a servant of mine," and he "accordingly enclosed the case, drawn up with an exactness in point of Fact, for which I desire my credit may be looked upon as a guarantee," &c.

"The case" was that of Mary Betts, aged 26, a young country maidservant in the Lord Chief Baron's family, who, "being naturally of a weak constitution, and labouring for some time under an ill Habit of Body, was on Whit-Sunday last struck with a Dead-Palsy which intirely deprived her of the use of her Limbs." Mr. Apothecary Clutton then tells us how "an opportunity fell in my way of having some conversation with the Publisher of these Medicines"; he was called to see a neighbour, "whose name I since learnt is J. Smith," who was suffering from a colic which the patient thought was due to gravel; "in the meantime, casting my eyes upon a Chest of Drawers, I perceived about twelve Bottles, which, by their size and shape, I concluded might come with the *Drop!* I then asked him if those were not Ward's Drops; he said "Yes.' 'I hope,' said I, 'thou hast not taken any of them.'" Later on, in company with Mr. Mason, a surgeon in the neighbourhood, he returned to the patient to desire him to have "the advice of a Physician"; they met Ward in the sick-room, and then and there Joseph and Joshua proceeded to argue and to wrangle at the bedside in a way which would have justified Mr. Lloyd George's idea of the practice of the profession. We may be sure, from the account given by Joseph, that he did not let the quack dog get the best of it, and that Joshua did not score many points in the slanging match that ensued. When the apothecary roundly accused Ward and his physic with being the cause of the illness, all that Joshua could reply, in a ponderous Johnsonian manner, was: "Sir, you must not attribute the griping to my remedies, but to the greens which he eat." We must conclude that the greens did not agree with the gravel or the Drop with either.

Section II relates to twelve cases published November, 1734, in the *Grub Street Journal*, showing the bad effects of Joshua Ward's medicines. Case I, "in hopes of being made quite sound by this pretended *Catholicon*," became very ill, "but by safer remedies recovered," though several of the other cases, especially the phthisical ones, died.

Section III, the most lengthy, deals with the series of experiments and analyses undertaken by the apothecary to demonstrate the chief constituents of the remedies. After a time, as the "Dictionary of National Biography" tells us, hostile criticism became so persistent that Ward was misguided enough to bring an action for libel against the editor of the *Grub Street Journal*, when—

> "It was conclusively shown that beyond some slight knowledge of pharmacy, the plaintiff was destitute of medical learning, and that his pill and drop were preparations of antimony, very violent in their action, and quite unfit for general use, and that his remedies killed as many as they cured."

That arsenic also was one of "the component Principles of these pills" we learn from Joseph Clutton's pamphlet, in which an account is given (in Section III) of a series of analytical experiments, with a view to discover the ingredients of the medicines.

> "*Experiment II.*—I took some of this washed powder and put it upon a red hot bar of Iron; it melted together, evaporated all away and cast up a smoak which *stunck* very offensively like Leeks and gave me a sudden *Driness* in my throat: I took this for a full discovery that the white part of this blue Pill was arsenick; nothing but arsenick will give that rank porraceous smell."

In case some of my hearers may share my ignorance of this unaccustomed adjective, be it known to them that the word will be found in the dictionary as derived from the Latin *porrum*, a leek or small onion.

Ward enjoyed the patronage of a King (George II), who boasted that he cared nothing for "boetry or bainting," and was furious at the sight of books; his "immediate displeasure but more lasting esteem" were earned by the cure of a dislocated thumb, "with a violent wrench." Hereafter the Doctor was allowed an apartment in the Armoury Office, Whitehall, where he ministered to the poor at His Majesty's expense. Exposure of his ignorance and the dangerous properties of his remedies, together with the opposition of the orthodox, seemed only to fan the flame of his popularity. Well-known literary men were among his patients and supporters. Horace Walpole writes to Sir Horace Mann in 1760: "He rubs his hands with some preparation and holds it upon your forehead for which trouble hath found instant relief." Gibbon, in his "Autobiography," mentions Ward among those "successively summoned to torture or relieve him." Henry Fielding, though contemptuous of the regular profession, speaks with great gratitude of the quack, and extenuates the failure to cure in his own case. From the "Voyage to Lisbon" we learn—

> "The powers of Mr. Ward's remedies want no unfair puffs of mine to give them credit; and though this distemper of the dropsy stands, I believe first in the list of those over which he is almost certain of triumphing, yet possibly there might be something particular in my case, capable of eluding that radical force which had healed so many thousands."

It has been suggested that the representation of ascites in the print already shown is a portrait of this grateful patient. Fielding was certainly a tall man, who suffered from dropsy, and was, as we have seen, a patient of Ward; he died in 1754; the print in the British Museum is dated as published five years earlier.

Ward amassed a fortune, the bulk of which he bequeathed to a great-niece, Rebecca, daughter of Knox-Ward, Clarencieux King of Arms, and to his sisters; Knox-Ward's sons, Ralph and Thomas, are also mentioned in his will. The secrets of his medicines were bequeathed to John Page, who had helped him in his early life. Page arranged that the profits from the sales of the pills and drops should be divided between the Asylum for Female Orphans and the Magdalen Hospital, founded in 1758; the charity was placed under the charge of Sir John Fielding, the blind magistrate, half-brother of Henry the novelist. This disposition of the gains of quackery was possibly the first, but certainly not the last, occasion on which charity ultimately covered a multitude of sins.

In the Hall of the Society of Arts in the Adelphi there is a statue of Ward, by Agostino Carlini, "celebrated for his treatment of drapery," who exhibited at the Royal Academy 1760-86; it was presented by Ralph Ward, a son of Knox-Ward named in the will. By the courtesy of Sir Henry Trueman Wood, Secretary of the Society, of which Ward was a member, permission was given to photograph this statue, and it is here reproduced.

As to the term "quack" there is no general consensus of definition; it has sometimes been applied (*horribile dictu*) to fully qualified members of our learned profession; the divine Dr. Samuel Parr, who was termed the "Whig Johnson," has given us a fairly inclusive statement as to its meaning:—

> "It is applicable to all who by pompous pretence, mean insinuations and indirect promises, endeavour to obtain that confidence to which neither education, merit, nor experience, entitles them."

It is apparent that the methods of the quack doctor in the eighteenth century varied but little from those adopted in the present day; the difference is one of degree rather than of kind; unabashed impudence and bold advertisement were the necessary common factors then as now. The modern charlatan, however, has the advantage of his forbears, in that he has a wider circle wherein to show his wares by means of a cheaper and more powerful Press, which reaches a greater multitude of readers. The public will to be deceived is still manifest, and as in Herrick's time, with—

. . . "his potion and his pill,
His or none or little skill,
Meet for nothing but to kill"—Herrick, 1591-1674.

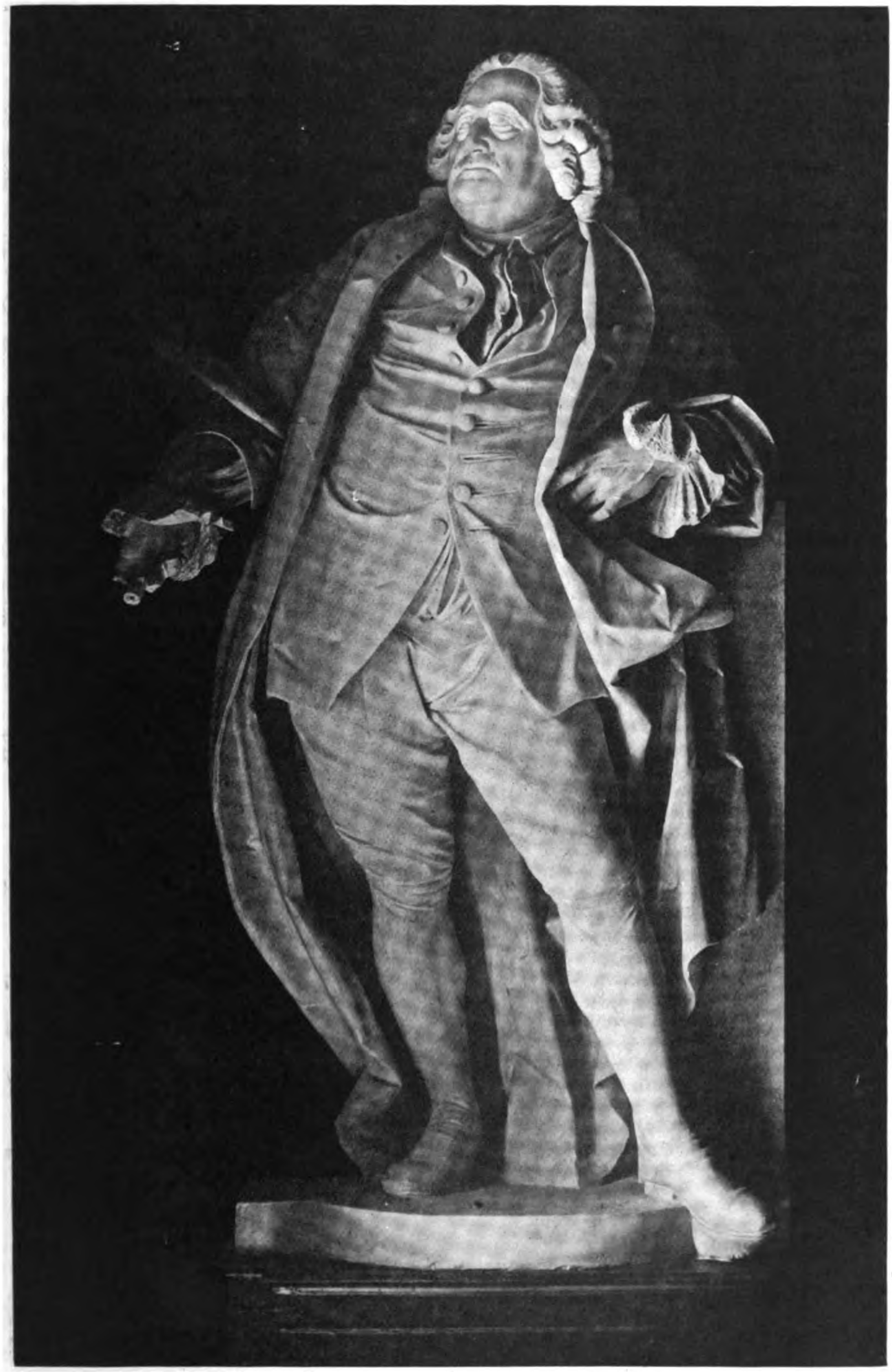


PLATE III.

Joshua Ward, by Agostino Carlini. (Society of Arts.)

Dr. J. D. ROLLESTON: As an illustration of the way in which Ward was regarded by the orthodox medical profession, the following anecdote may be told: "Queen Caroline asked General Churchill if it was true that Ward's medicines had made a man mad. 'Yes, madam,' replied Churchill, 'Mead.'" Probably Ward's most vigorous opponent was Daniel Turner, a voluminous writer on skin diseases and syphilis, and a bitter enemy of quacks of all kinds. His pamphlet, published in 1735 for the price of sixpence, was entitled, "The Drop and Pill of Mr. Ward consider'd: as well in Respect to their Composition as their Operation and Effects, Wherein, as there is great Reason to believe, the genuine Receipt of both. In an Epistle to Dr. James Jurin." Turner's pamphlet provoked a counterblast from a writer named Edmund Packe, M.D., son and successor of a well-known quack, Christopher Packe, in a pamphlet entitled "An answer to Dr. Turner's letter to Dr. Jurin on the Subject of Mr. Ward's Drop and Pill, wherein his Ignorance of Chymical Pharmacy is fairly exposed, as also his injurious Treatment of Mr. Ward and his indecent Reflections upon my Lord Chief Justice Baron Reynolds' Account of a remarkable Cure by Mr. Ward are justly considered." Lastly there was an anonymous pamphlet, possibly written by Clutton, published in 1736, with the appropriate title, "Si populus vult decipi, decipiatur," and entitled "Pilulae Wardeanae Dissectio et Examinatio, or Ward's Pill dissected and examined and its true composition plainly discovered even to an Ocular Demonstration in a Latin Epistle to the ingenious Dr. Boerhave."

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*February* 16, 1916.)

The Portrait of Paracelsus at the Museum at St. Gall, Switzerland.

By Professor CHARLES GREENE CUMSTON, M.D. (Geneva).

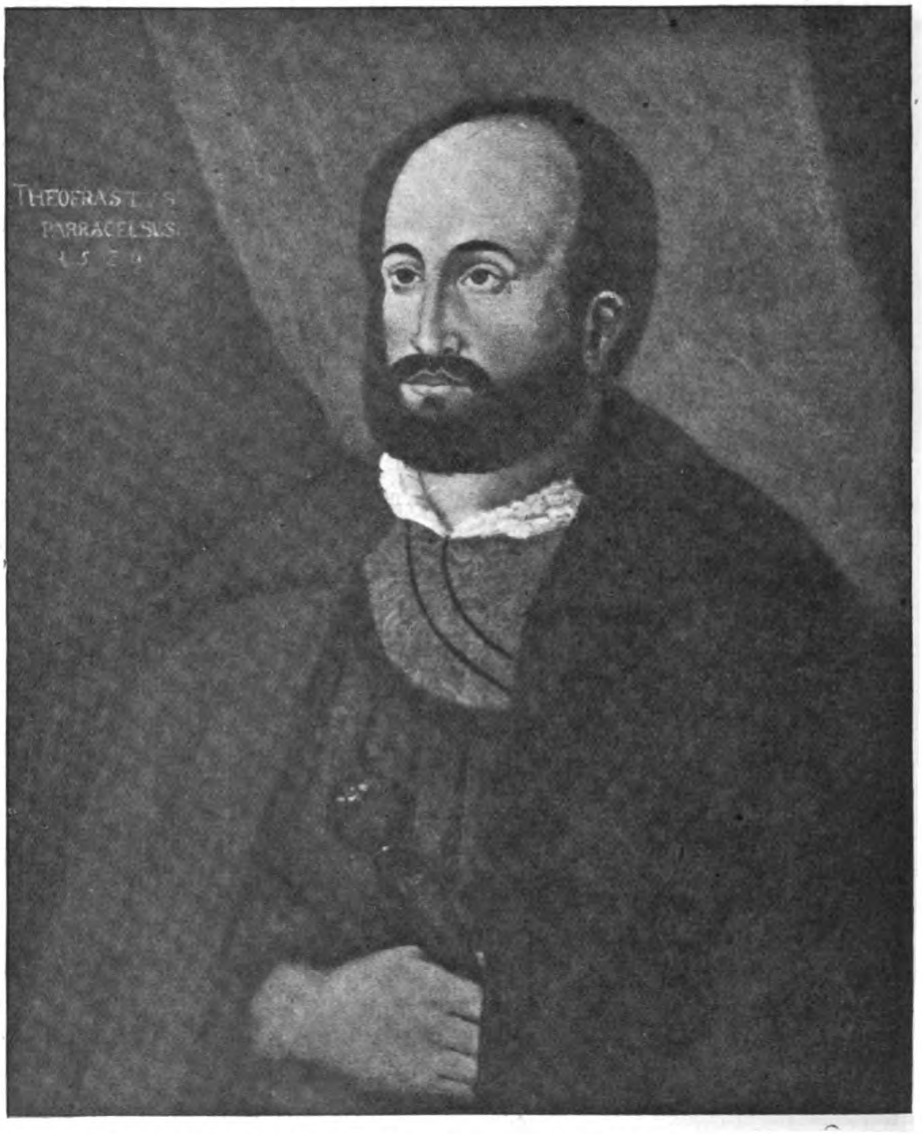
DR. MERCIER, in his recent comparative study on "Paracelsus and van Helmont," is, I think, unduly harsh in his criticism of the former, and makes what I consider a most erroneous allegation—to wit, that Paracelsus was a eunuch. I had supposed that this statement formerly made by his many contemporary enemies had been shown to be false by several competent authorities in recent years. In referring to Paracelsus's modesty, Dr. Mercier says that when he (Paracelsus) burned the works of Galen and Avicenna on the public place in Bâle, he at the same time assured "the crowd of students who flocked to hear him that his shoe-strings knew more of medicine than these venerable authorities, and that all the universities and all the authorities put together knew less of medicine than the hairs of his beard. The statement gathered an added piquancy from the fact that Paracelsus was a eunuch, and had no beard to speak of."[1]

I am perfectly well aware that the portrait of Paracelsus at the age of 24, now at the Louvre in Paris, and Hollar's engraving of the portrait formerly at Blenheim, depict him as beardless, but I now present a photographic reproduction from my private collection of the portrait of von Hohenheim contained in the Museum of St. Gall, Switzerland, taken at the age of 36. Since it was painted in 1529, he must have sat for the artist *after* he had left Bâle, because he was called to profess at the University of that city in 1526.

A superficial examination of this portrait is quite enough to show that there is no evidence that Paracelsus was a eunuch or that he was beardless. Quite on the contrary, his beard is full, bushy, and virile, while the features are certainly not those of a male subject deprived of the internal testicular secretions. I would add that this portrait is authentic, although the artist's name is unknown.

---

[1] *Proc. Roy. Soc. Med.* (Hist. Sect.), 1915, ix, p. 2.



The portrait of Paracelsus at the Museum at St. Gall, Switzerland.
The artist is unknown.

I believe that it has been abundantly proved that the varied accounts relating to the private life and character left us by his miserable underling, Oporinus (a villainous scamp, if ever there was), are false, and have not stood the test of modern investigations. Let it be understood that I have no admiration for Paracelsus, as will be made evident if one consults my recent article, entitled "Mediæval Medicine and the Founders of Medical Reform."[1] In this paper I say: "Paracelsus's method was to address himself to the imagination and to strike it by the strangeness of his recipes, and this probably explains his incoherent diversifications. However it may be, whether Paracelsus was a vulgar charlatan or a sincere mystic, but ill-timed, with some intervals of lucidity, it nevertheless is certain that he is not worthy of figuring among the true reformers of medicine. . . ."

Thus it is manifest that I concur in much that is laid down in Dr. Mercier's article, but, at all events, let us not continue the legend that Paracelsus was a eunuch.

DISCUSSION.

Dr. J. D. ROLLESTON: I thought it would be of interest to members of the Section to see the other portraits of Paracelsus, of which the library of the Society has a good store, and at my suggestion the librarian has kindly put them on view. Among them is another bearded portrait which was painted in Venice when Paracelsus was about the age of 30. It has sometimes been attributed to Tintoretto, though at the time this artist could not have been more than the age of 4.[2] The extraordinary obesity and glabrous skin shown in the well-known portrait at the Louvre, with Dinant in the background, sometimes attributed to Albrecht Dürer, but more probably the work of Scarel, are certainly suggestive of a eunuch or of a person suffering from some disorder of the internal secretions.

Dr. HINGSTON FOX: The portrait is not unlike that ascribed to Tintoretto, although inferior in execution to it. The face is suggestive of reason and thought rather than of assumption and bombast, as in the be-hatted earlier portrait with the flowing curls: Our accounts of Paracelsus come from his opponents, and it is possible that this reformer, who broke away scornfully from tradition and tried to follow Nature, was not so bad as he was painted. The Galenists hated the Chemists, of whom he was a champion.

Dr. PARKES WEBER: The St. Gall oil painting of Paracelsus as a young man (bearded), dated 1529 (of which the photograph is exhibited to-day), is illustrated in Dr. Carl Aberle's work, "Grabdenkmal, Schädel und Abbildungen des Theophrastus Paracelsus," Salzburg, 1891, Plate 4, and Dr. Aberle gives some very interesting notes regarding this oil painting and how it came into the possession of a family of St. Gall.

[1] *Internat. Clin.*, 25th ser., 1915, iii, p. 185.

[2] A. M. Stoddart, "The Life of Paracelsus," 1915, p. 71.

(*February* 16, 1916.)

Marat.

By C. EDWARD WALLIS, M.R.C.S., L.R.C.P., L.D.S.

IT is somewhat strange that no English-speaking "medical writer" has ever given any special attention to the scientific career of Marat, the notorious French revolutionary, and yet he was both a scientist and a London medical practitioner before he entered upon the bloodthirsty career for which I suppose he will be ever remembered. Like certain other great Frenchmen, he was of Italian origin, though born in the Swiss Canton of Neuchâtel in 1743. His real name was Jean Paul Mara, the "t" having been added later to give his name a more French appearance.

The father of Marat seems to have been a gentleman of many occupations, for at one time he was a designer, at another a chemist, and, later, a teacher of languages; there is, however, no reason to doubt that his parentage was, socially, satisfactory, though his mother, Madame Mara, a Swiss by birth, seems to have been described by certain neighbours as possessed of a diabolical tongue, and as a notorious liar, a slanderer, and a renegade wife.

Marat, in one of his publications, known as *Le Journal de la République française*, has left us a remarkable account of his youth, in which he says that he was born with an impressionable nature, a fiery imagination, a heart open to every lofty passion and, above all, to the love of Fame which devoured his mind. Marat also declares that his *moral sense* was already developed at the age of 8, for even then he could not bear to see ill-treatment practised upon another, that "the sight of cruelty filled him with indignation," and that "injustice made his blood boil like a personal outrage."

At the age of 18 Marat left the paternal roof and went to study medicine in Toulouse and Bordeaux, after which, for fourteen years, he seems to have divided his time between England, Scotland, Ireland, Holland, and Paris, where he settled for a time in 1751. About the year 1765 he again returned to London, when he commenced practice as a doctor in Church Street, Soho, and remained for ten or twelve years, during which time he seems to have been a welcome guest in the best literary, scientific, and artistic circles. While in London he wrote in English a large number of scientific and philosophic books and pamphlets, of which the first was "An Essay on the Human Soul," published in 1772. Another of his works, this time in French, was entitled "The Discoveries of M. Marat on Fire, Electricity, and Light," which received the approbation and honourable mention of the French Academy of Sciences. The last purely scientific work of Marat was published in 1788 on the subject of "Light," in which appeared, among others, essays on the rainbow and the colour of the sky at sunrise and sunset.

With regard to the medical career of Marat it is uncertain whether he ever took a medical degree in France, but somehow or other he certainly received the degree of Doctor of Medicine from the University of St. Andrews in 1775, that is, some ten years after he had commenced practice in Church Street, Soho. I will not attempt to read the diploma, but will merely quote therefrom the special paragraph relating to Marat himself, as follows:—

> "Since Jean Paul Marat, a very distinguished master in arts, has given all his attention to medicine for several years, and has acquired a great skill in all branches of the science: With the approbation of numerous doctors in medicine, there has been conferred upon him the supreme grade of doctor in medicine."

This degree was equivalent to an honorary one, and, as was the custom of the time, was conferred on the recommendation of two medical men known to the Senate—namely, Dr. Hugh James and Dr. William Buchan.

There is some reason for thinking that Marat had obtained other medical degrees, since, on his appointment in 1777 as Physician to the Body Guard of the Count d'Artois, he is described officially as "Doctor in Medicine" of several English faculties. Marat held this post for nine years, at the end of which he resigned in 1786.

While practising in Church Street Marat published two medical "tracts," as they are called, the first of which is dedicated to the "Worshipful Company of Surgeons," in London, and dated November, 1775, while the second, entitled "A Singular Disease of the Eyes," is dedicated to "The Royal Society." The first of the two "tracts" referred to is entitled "An Essay on Gleets," while the second tract is entitled "An Enquiry into the Nature, Cause, and Cure of a Singular Disease of the Eyes," both by Jean Paul Marat, M.D.

In his essay on "Gleets" Marat strongly condemns the use of *common* bougies, as he called them, on account of their irritating properties, and follows by describing what he calls a proper way to cure "gleets," by means of special bougies of white wax, followed by the use of diachylon in gum, after which an injection of a weak solution of sal ammoniac was prescribed four times daily. Marat concludes this essay of 21 pages by observing that "there is no Gleet incurable, nay there is none which cannot easily and speedily be cured if properly treated."

The affection of the eyes described in Marat's second tract he attributes to the use of certain mercurial preparations, and mentions it as having been hitherto confounded with "gutta-serena," which was also known in those days as "black cataract," and was the form of blindness from which the poet Milton suffered.

Marat's first political work was entitled "The Chains of Slavery," and was written and published in London in 1774. In it his revolutionary ideas of social reform began to show themselves very clearly. His first writing with a direct bearing upon the Revolution appeared in 1788, in the form of a pamphlet called "Offrande à la Patrie"; it dealt specially with the miseries of the people as being due to the iniquities of "Finance Ministers."

As Marat's political career alone would fill a volume, I shall not attempt to deal further with it, but pass at once to the man himself and the diseases from which he himself was a sufferer.

Carlyle describes him as a "large-headed, smoke-bleared, dwarfish individual with blue lips, and his temperament as acrid and corrosive as the spirit of sloes and copperas." A contemporary describes him as being only 5 ft. high, with bow legs, and a very large head and aquiline nose. It would appear that Marat had two personalities: (1) The one, that of a scientist and philosopher, which died in 1789, the year of the fall of the Bastille; (2) the other, that of a fanatical journalist, pamphleteer and demagogue.

Marat throughout his life had always endeavoured to attract public attention, and when opposed by others became morbidly introspective. He was despised and jeered at in academic circles, and believed himself persecuted and libelled by everyone. Cabanès declares that Marat was hypochondriacal and exaggerated greatly his own infirmities, and that he poured out his bile in pamphlets and his bad temper in sentences of death. Cabanès suggests that it was the bodily infirmities that warped Marat's frame of mind, and that the perpetual irritation and itching of the pruritus from which he suffered caused his temperament to become sanguinary and ferocious. Marat suffered from insomnia and constant headaches: that is why he is often represented with a cloth on his head, this cloth being soaked in vinegar. Cabanès believes that Marat's skin affection was of the nature of eczema, affecting largely his scrotum and perineum, and that the exacerbations of his pruritus coincided with the violence of his phrases in *L'Ami du Peuple* and the other revolutionary journals to which he was the chief contributor. The only way by which Marat could get relief from his pruritus was by constantly sitting in the well-known shoe-shaped bath, which was made of beaten copper, and across which a board was put on which Marat used to write his articles for *L'Ami du Peuple*, &c. The curious shape of the bath seems to have arisen from the necessity of economizing water owing to the difficulty and expense of carrying it upstairs and from a distance. I am, however, indebted to Dr. Graham Little for the suggestion that Marat's affection was probably dermatitis herpetiformis, on the ground that the irritation and pain from which he suffered were alleviated by sitting in a bath of water, whereas eczema itself would have been much aggravated by contact with water.

As is known to all, it was while he was sitting in this bath that Charlotte Corday stabbed him in the chest on July 13, 1793. Charlotte Corday, who was guillotined for this crime, is said to have died saying: "*One* man have I slain to save 100,000."

Members of the Odontological Section of this Society will be interested to know that the man who rendered first aid to Marat was a dentist named Michon-Delafondée, who practised in the same house; Delafondée bandaged up the wound, had Marat put on his bed, but soon found that he was beyond human aid.

Marat was almost deified after his assassination, a magnificent funeral was accorded him, and he was buried in the Panthéon, the anniversary of his death being kept as a fête-day to the end of the Revolution. Later, however, the memorials of Marat were thrown down and broken in pieces, his remains being removed from the Panthéon and thrown into the common burial ground.

Such, then, is the tragic story of probably the most notorious doctor of medicine our profession has ever known.

Dr. GRAHAM LITTLE: I am much interested in Mr. Wallis's admirable paper. It is, of course, notoriously difficult to make a diagnosis of diseases from descriptions of them afforded by poor observers and at a remote period. But the symptoms so graphically detailed by Mr. Wallis, the long duration of the skin affection from which Marat suffered, and more particularly the means sought to give relief, point to a diagnosis of dermatitis herpetiformis, a popular French treatment of which to this day is immersion in more or less continuous baths. This treatment is unlikely to have afforded relief in eczema, which, moreover, is rarely so irritating as this eruption seems to have been. And the collateral symptoms of great nervous excitement which are so characteristic of dermatitis herpetiformis seem to have been present to a marked degree in Marat's case, and indeed the agony of this disease is such as almost to excuse any degree of ferocity in a patient under the paroxysm of this terrible affection.

(*February* 16, 1916.)

A Sixteenth-Century Oculist.

By Percy Dunn, F.R.C.S.

Andreas Laurentius was a French anatomist of distinction; but he was also Physician to King Henry IV of France, and Professor of Physic in the University of Montpellier. At the end of the sixteenth century he published a book under the title of "A Discourse of the Preservation of the Sight," incorporating with it three other treatises, respectively upon Melancholike Diseases, upon Rheumes, and upon Old Age. This curious medley of subjects requires some explanation. Among his patients was a duchess, or, as he describes her, "The noble Lady, Madame, Duchess of Uzez and Countess of Tonnera." This noble patroness suffered from various complaints. She was blind in the right eye from cataract; she suffered from touches of the windy melancholy; she had "petty distillations and fluxes of humours which fell upon her eyes, teeth, arms and legs," whatever that may mean, and finally she was not young. Becoming interested in her diverse pathological developments, she commanded her physician to set out in writing his views and comments regarding the features of her maladies. He conformed to her request by writing this book. In his dedicatory epistle, however, it is worthy of note to observe that he disclaims any maladroit insinuation that she could possibly be old, such as the treatise on old age might seem to convey. "I am persuaded," he says, "madame, that no man can call you old in any respect if it were not that you are past fifty, and that custom in accounts hath designed the first degree of old age to this number."

That salve of flattery, doubtless, was sufficient to soothe the susceptibilities of this duchess of uncertain age.

Incidentally, this dedicatory epistle is well worthy of perusal. It throws into strong relief the extent to which our forefathers studied and cultivated the faculty of ingratiation with their patients as a necessary adjunct to their professional work. Indeed, the skill they displayed in playing upon the harp of human nature suggests that the art of flattery was by them almost raised to the position of an exact science. In these days it would be impossible to equal, still less to excel, them in their exuberance of the praise of virtues; in their faculty of turning faults into the sweet confectionery of laudable acquisitions; in their success in creating pleasantries of thought exquisitely adapted to promote complacency of approbation; and last, but not least, in their felicitous methods of alluring patients to their allegiance by surrounding them with an atmosphere of self-satisfaction more stimulating and useful in its effects than anything which professional skill could accomplish. The author's book became popular, and many editions were called for.[1] In time it attracted the notice of one Richard Surphlet, an English practitioner of physic, by whom it was translated, the English edition being published in 1599. From the translation this paper has been compiled, and a copy of the book will be found in the libraries of the Royal College of Surgeons and the Royal Society of Medicine, in each case being duly regarded as a treasured possession. But here it may be observed that, as Laurentius shows us, qualms of conscience troubled him previously to the publication of his book. He became obsessed with misgivings as to its reception by his professional contemporaries. Moreover, he expresses the fear in his preface that "some physicians will find themselves grieved for that I have made vulgar the secrets of our art." The inference, therefore, is that the book was written more from a popular than from a professional standpoint, and that the author laid himself open to hostile criticism in consequence. We should, however, believe that the author unnecessarily alarmed himself. Judging from its pages, there is but little to stamp the work as less than a professional one. Indeed, he describes one chapter as having been especially written for the benefit of young physicians and surgeons. His noble patroness, therefore, must have been an exceptionally educated woman if she found this book generally within the compass of her understanding.

---

[1] The last recorded edition was published at Rouen in 1630, long after the author's death.

For our purpose, however—to point out the knowledge which prevailed in the sixteenth century upon the subject of ophthalmic surgery—the author's book is admirably adapted. It was compiled by a man of distinction and of renown. In a concise form it contains all the main features of the subject, forming an authoritative reflex of the knowledge of the period, and, in comparison with that of the present day, provides many points of interest. The book consists of 194 pages, seventy-one of which are devoted to the discourse upon the sight. The preliminary chapters, being mostly confined to speculative and philosophical dissertations upon the seat of the soul—localized by the author to the brain—and flights of fancy, burdened by sentiment, showing the marvels of the eye as the organ of vision, call for no special comment. Our survey commences, therefore, with the fifth chapter, in which the author begins to stretch himself out in the fulfilment of his task by discussing the anatomy of the eye. Throughout his pages the author's mind seems to dwell, at times inordinately, upon the authority with which he speaks as an anatomist. Scornful criticism is occasionally expressed regarding the views of others, from whom he differs. This criticism is not confined to the ancient anatomists, but is visited as well upon his contemporaries. And yet how shall he be judged by the standard of knowledge of the present day? The impression gathered from a perusal of his description of the anatomy of the eye is one of surprise that our forefathers should have propagated so many inaccuracies in anatomical detail. The author himself admits that "anatomy manifests itself unto our eyes"—in other words, that the matter is mostly one of observation. A microscope, inaccessible to him, is not required to confirm the course and relations of an artery; that is the knowledge which dissection reveals, and that is precisely the point which strikes us, namely, that our forefathers must have been very indifferent dissectors, otherwise the errors which passed current as anatomical facts in their days could not have been recorded; and yet it is of interest to recall that matters of minute detail at times did not escape them. Two of these may be mentioned in regard to the eye: our forefathers were aware, as the author shows, of the capsule of the lens as well as of the hyaloid membrane; the knowledge of these delicate structures shows both careful investigation and sound observation. But such accuracy of observation was not the rule, as we shall gather later.

The author considers first the coats of the eye, called by him the tunicles. Some controversy existed as to the number of these. Hippocrates divined that there were four, Galen five; the anatomists of the author's day held that there were nine; but "as for myself," he says, "having with all carefulness perused the leaves of this book of Nature, I cannot find more than six." The first he calls the white coat, otherwise the conjunctival membrane. By the conjunctiva he shows that he means the sclera. "This tunicle," he continues, "is very strong, and arises from the pericranium, and it ends at the circle called iris." Incidentally, this is the only reference to the iris which occurs in his book; moreover, his view that the sclera is derived from the periosteum of the skull, and that this coat ends at the iris, is very much discounted by our knowledge in the present day. The second coat is given as the cornea, "or horny membrane, because it may be divided into many little skins or thin membranes." Next we come to a surprising statement, namely, that the cornea is derived from the dura mater. Upon what grounds our forefathers were able to satisfy themselves of the accuracy of this allegation it is impossible to conjecture. Nevertheless, as we must admit, it reveals an indirect truth by reason of the fact that the sclera is continuous with the cornea, and that the sclera behind is continuous with the dura mater, through the optic nerve sheath. The only explanation which the author gives of the cornea being derived from the dura mater is that both of these structures are hard, and the illuminating information is conveyed that the "cornea is called hard because of its hardness"; therefore, the anatomical student of the author's day was left to assume that, because both the cornea and the dura mater possessed the same physical feature of hardness, it was obvious that they must form part of each other. Another instance of this misconception is noticeable in the description of the third coat, named by the author the "uvea." He adds: "It is also called the choroid because it containeth all the vessels which serve for the nourishment of the other coats, or because it cometh from the thin and tender skin compassing the brain, called the pia mater, which is of Galen oftentimes called choroid." Even in the days of the sixteenth century it is difficult to understand how an anatomist, relying upon his powers of observation, could have claimed that any connexion could have existed between the pia mater and the choroid. Some excuse, however, may be conceded for this if we recollect the confusion which existed in regard to the use of the term "choroid" in former days. The term was employed indiscriminately to signify vascular structures—such, for example, as the choroid plexus; even Cruveilhier, in his book on anatomy, affirms that "choroïde est synonyme de vasculeuse." Thus the older anatomists must have assumed that, since a vascular plexus existed in the brain, called the choroid plexus, therefore the choroidal coat of the eye, being also vascular, must be in anatomical relationship with it.

We learn, as I have already pointed out, that the iris, as such, was not recognized by our forefathers; it was regarded merely as part of the choroid, with which, of course, it is continuous through the ciliary body. "The choroid," says the author, "compasseth the eye round about, except before only where being bored through, it maketh a little round hole, which is called the apple, and is the principle window of the eye, which when being shut in by cataracts causeth us to live in continual darkness. This is the only coat which is parti-coloured: on the foreside it is as it were black, thereby to hold together the form of objects; on the innermost, or hinder side, it is blue, green, and of many other colours, thereby to refresh the crystalline humour when it is weary." This latter observation is of interest as being a novel attempt to explain the physiological reason for the presence of the varied pigmentation of the iris. Among the functions assigned by the author to the uveal coat is that of "keeping together and hemming in the spirits which otherwise would spend and disperse themselves abroad"—in which description we may recognize the usefulness of the pigmentation of the choroid, and of the dilatation and contraction of the pupil in controlling the admission of light to the eye. The fourth membrane is called the cobweb-like coat; "it covereth and lyeth close unto the crystalline humour, and serveth to unite and retain forms of things, as the lead doth in looking glasses." Thus is plainly shown the fact that the author was aware of the capsule of the lens.

The fifth coat is referred to as the net-like tunicle: "It is," he says, "overcast with a million of little threads, after the fashion of a net. It groweth from the forepart of the sinew of sight [optic nerve] which is naturally given to dilate and widen itself, and this is the cause why, when it is cast into water, we shall perceive it to be all white, soft, and, as it were, marrow-like"; and such was the retina illuminated by the quaint verbiage of a sixteenth-century writer. He names the vitreous or glassy tunicle as the last, adding sententiously, "the learned of ancient times have not known it." Apparently the remains of the hyaloid artery were also recognized at this time. We read: "There is to be seen in the midst thereof [vitreous] a round circle like unto the eye-brie. I suppose it to be a number of small veins which convey blood into the said vitreous humour, that there being laboured, it may be made white and fit for the crystalline humour." And with this the author completes his description of the anatomy of the coats of the eye. Of this description it may be said that, to contrast it critically with our present knowledge would not accord with justice. Our forefathers were lacking in many of the methods of investigation which we possess; nevertheless, they showed good observation in some respects, observation which alone could secure the discovery of actual anatomical facts. On the other hand, they displayed a weakness for speculation; their anatomical knowledge was oftentimes created upon an assumption—instead of endeavouring by patient, practical inquiry to solve an anatomical problem, they were wont to take a shorter route and advance a solution upon the basis of conjecture, without any real grounds to support their conclusion. This method is equivalent to seeking to define the course and relations of an artery by a process of reasoning, leaving out of the question the revelation of the facts by dissection.

A feature conspicuously noticeable throughout the author's pages is the picturesqueness of his descriptions. His similes often reach a poetic flight, and in drawing fully upon his imagination, sentiment and imagery are combined in such degree as to compel attention. Often when he begins an effort of this nature he seems to be carried away by the sublimity of his subject in, as it were, a breathless chase to record his impressions with the energy of the moment. And so we find he allows himself no time for the sobering influence of full stops. He rushes on into almost full-page paragraphs, until the glow of his inspiration has spent itself. Here is a typical example of his style, the brain being the subject of his panegyric :—

> "Let nothing, then, hinder us from acknowledging the brain to be the most noble part of the whole body: this is that magnificent and stately turret of the soul, this is that goodly Royal Palace, the consecrated house of Pallas, this is the impregnable fort, environed with bones, as with strong walls, where in is lodged the sovereign power of the soul (I mean reason) which comprehendeth and compasseth as with bracing arms, the whole universal world, in a moment, without touching of the same, which flieth through the air, soundeth the depths of the sea, and surmounteth at the same instant the pavements of the heavens, and which walking upon their stages, measuring their distances, and communicating with the angels, pierceth even unto the throne of God, and at such time as the body is asleep, suffereth itself by a holy flight, or delectable or sweet ravishment, to be carried even to the beholding of God, according to whose image it was first framed."

There can be but one impression conveyed by this rhapsody, namely, that every post-mortem examination of the brain must constitute a gross act of desecration. How could a pathologist, suffused with this consciousness of what the brain was, calmly bring himself to mutilate the organ in his search for a cerebral growth?

Another instance of the author's descriptiveness may be quoted. The venue is changed to the lens:—

> "Lo, thus all veils, shadows, and coverings being taken away [from the eye], it is now time to make a plain and open show of the most precious jewel of the eye, that rich diamond, that beautiful crystal, which is of more worth than all the pearls of the East. This is that ice-like humour, which is the principle instrument of the sight, the soul of the eye, the inward spectacle; this is the humour which alone is altered by colours, and receiveth whatsoever forms of the things that are to be seen. This is that crystalline humour, which is more hardy wise than Hercules, dares to encounter at once, namely the outward and inward light: this is that crystalline humour, which all the other parts of the eye acknowledge as their sovereign, and themselves the vassals thereof: for the horny tunic doth the office of a glass unto it, the apple, the office of a window; the grapelike coat is a fair flowering garden to clear and rejoice the same after wearying labour: the cob-web like coat serveth like lead to retain such forms as are offered: the watery humour as a warlike forward to intercept and break off the first charge of the objects thereof, essaying all upon the sudden and with headlong violence to make breech and entrance. The vitreous humour is his cook, dressing and setting forth in most fit sort his daily repast. · The nerve optic, one of his ordinary messengers, carrying from the brain thereto, commandment and power to see and conveying back again with all speed whatsoever hath been seen. The muscles are his trusty steeds and courageous coursers, whereupon being mounted, it advanceth itself aloft, casteth itself alow, turneth itself on the right hand and the left, and finally in every such sort as seemeth best unto itself . . . This crystalline humour is the steel glass of the mind, by which it looketh upon the forms and faces of things and combineth the lights which before were several and asunder."

It is difficult at first to grasp the full grandeur of these regal attributes of the lens. They are reminiscent of the luxuries commonly associated with the life of a millionaire. How do they appear in a practical light? It seems that the lens possesses a courage superior to that of Hercules, in its domestic environment that it is provided with a window, properly glazed, through which to see things, a garden full of beautiful flowers of many colours to refresh its drooping spirits; a moat to secure its exclusiveness and keep off undesirable intruders, a chef to supply delicious meals, a park wall made of lead, a messenger always on duty to convey its orders, and a stable full of horses, speedy and powerful, ready and eager to submit to its will to take it in any direction. Possibly this great effort of the author's imagination was especially intended to excite the enthusiasm of his noble patroness, the duchess, who suffered from an opaque lens.

In setting himself the task of writing this book the author seems to have determined to make originality one of its main features. It may be that as an anatomist he was ahead of his times, and in proof of this he sought to avail himself of every opportunity to correct errors of observation which passed as current and accepted knowledge. At times he writes with an openness of expression, unrestrained by any of the amenities of professional decorum. Thus, in a somewhat scathing criticism in allusion to the recti muscles, he writes: "The old writers being grossly conceited in matters of anatomy have thought that these four muscles sprung from within, from the membrane called the dura mater, but they were foully deceived, for so they ought not, and much less could they." After pointing out why the old anatomists were wrong, he adds: "We must, therefore, believe and hold that the four muscles do take their beginning from within the collet, from some part of the bone, called sphenoides, and holding diverse courses, do fasten themselves unto the white coat." It would, however, have been more to the point had he shown by actual dissection—not a difficult matter—the bony point from which the muscles arose. Again, in another passage he succeeds in pointing out an error. He refers to the belief held in his time by all anatomists that there was a seventh ocular muscle, attached to the optic nerve, for the purpose of keeping the eye in its place. "But these anatomists," he says, "are deceived, for there is no such found, but in four-footed beasts which have their eyes so much hanging down toward the earth, while man ordinarily carries his face lifted up to Heaven, and so has no need for such a muscle." A further instance occurs in which he shows himself on the warpath. Much discrepancy of opinion prevailed in his time as to the seat of origin of the optic nerve. By some authorities of ancient date that origin was said to be in the lateral ventricles, by others in the cerebellum, a view which was accepted as correct by all the anatomists contemporary with the author. He holds, however, and maintains a contrary opinion, for, he asserts, the seat of origin is "in the hinder part of the brain, where the great and little brain do join." "This observation," he continues, "is new, but most true, and I receive it, because I have often seen it." The firmness of the assertion would suggest that the observation was his own; moreover, it is noticeable as placing in the close neighbourhood of the lower and central visual centres the origin to which the nerve has since been traced. He was well aware of the optic commissure, but in referring to it advances quite a novel explanation of its presence. He claims that its purpose is to give strength to the optic nerves, otherwise, the nerves being very soft and having a long course to traverse, they might become "bended," and thus lose their functional power. Allusion is afterwards made to further "nerves marching unto the muscles of the eye." He says: "Their dividing of themselves is pretty, full of kindness, for they send to every muscle, as it were, a fine little thread." The orbital fat, he maintains, keeps the eye moist and prevents it from withering; moreover, that "it preserves the warmth of the eye, and so the eye is never tainted with a shivering or quaking cold." Vague notions seemed to prevail upon the subject of lachrymation. The author nevertheless admits "that there are belonging to the eye certain glandules and kernels which water the eye, as also drink up like a sponge, the moisture falling upon them from the brain." The information thus conveyed lacks something in detail from a professor of anatomy.

Our forefathers were evidently greatly puzzled with the question of "How we see." Plato was the chief disturber of the anatomical or physiological conscience in this regard. He stoutly maintained that the eye was full of light of the nature of fire, of fire which gave light but which did not burn, "like unto the celestial fire." Those agreeing with him held that he was right because, when the eyes were rubbed, there was the consciousness of seeing bright lights. Other proofs mentioned were that the eyes of Tiberius Cæsar were so quick and full of light that Pliny recorded that a glance from them used to frighten Cæsar's soldiers, also that the eyes of cats and wolves shone in the darkness. Thus obviously the eye being, as the author affirms, "full of fire and sparkling streams," no other conclusion was possible than that the eye "seeth by emission." Naturally this power having been conferred upon the eye, the evil influence of a look was readily explainable. Some curious instances of the power of the eye in this regard are given. "The Basiliske,"[1] we learn, "poisoneth all them which look upon him. Women having their natural courses infect the looking glasses upon which they cast their eyes"—that is to say, in modern construction, a menstruating woman could, by merely looking at a sterile glass plate, cause it to become the seat of a bacterial infection. It is very fortunate that science has come to the aid of women to acquit them of so unfounded a pathological crime. The author, we note, is polite enough to limit the woman's evil capacity in this regard to a piece of furniture. Again, the statement is made that a wolf which first catches sight of a man causes the man to become hoarse; presumably, however, this would depend upon how much of the man was left after the wolf had finished with him. Furthermore, it is positively asserted that if a man with healthy eyes looked earnestly into the eyes of another man whose eyes were red and inflamed, the former would be attacked with the same disease as that from which the latter was suffering. Happily, no such information is conveyed in the text-books of the present day, otherwise malingerers would certainly profit by it. The author next supports his conviction, in agreement with Plato, by introducing as a witness the domestic cat. " Go not," he asks sublimely, " the cats on hunting in the nights? And do they not cast out some glittering streams? " This unquestionable impeachment may be admitted, but it is not the glitter of the cat's eyes which destroys our sleep! Altogether the author devotes himself to nine distinct reasons favouring the belief that " we see by sending forth something."

---

[1] The Basilisk belonged to Greek and Roman mythology. It is curious, therefore, that the author should have assigned scientific significance to the fable of its existence, although among modern naturalists the term has been retained to indicate a genus of Saurian reptiles of the Iguanian family.

But the fire soothsayers, led by Plato, were not allowed to have it all their own way. There appeared on the scene Aristotle, with a hose. He it was who extinguished the celestial fire skilfully and successfully by pointing out that the eye was full, not of fire, but of water. How, he asked, could the eye contain fire when the sovereign of the eye, the crystalline humour, merely consisted of congealed water? Again, when the eye was pierced, water, not fire issued forth. Moreover, the eye was like a looking glass "which receiveth all such shapes as are brought unto it, without sending anything of its own unto the object." In the end, after a full discussion of the various arguments amounting to seven in favour of Aristotle, the author bravely affirms he is convinced that Aristotle is right. " I will therefore," he says, " set foot with the stronger side, and maintain with Aristotle, that we see by receiving only, and that there goeth nothing out of the eye which may serve for the making of us to see, and as concerning the foundations of the Platonists, it is easy to overthrow them all. I confess that the eye hath great quantity of brightness in it, but it proceedeth not from fire; it cometh from the crystalline humour, and from the shining of the tunicles, for all polished substances, being after the manner of the horny membrane, do shine in the dark. There is no fire then within the eyes: there is nothing to be found, but water, crystal, and glass," and so was this celestial conflagration extinguished.

We come now to the subject of the diseases of the eye. The author explains that he has not troubled himself to draw forth an "exquisite description" of all eye diseases, inasmuch as the attempt would be too great, requiring twenty chapters instead of one consisting of nine pages and a half. At the outset he mentions that the utter loss and deprivation of the sight (blindness) occurs in one of three ways—namely, either from dryness of the humours or the hindering of the two lights, so that they cannot meet or join together in the crystalline humour. "The inner light, which is the animal spirit, is hindered by the obstruction of the nerve optic, and this disease is called gutta serena; the outward light is hindered by the cataract, which shutteth the apple of the eye, the window of the crystalline humour." The term "gutta serena," it appears, was of Arabian origin, to be afterwards superseded by the Greek word amaurosis, a recognized expression in the present day. When our forefathers were confronted with a case of blindness, the cause of which was not apparent externally, the disease was indiscriminately called "gutta serena," implying some defect of the optic nerve. In the course of the description of the diseases of the eye, in several instances we come across terms which still do duty in the terminology of ophthalmic surgery. Ox-eye, or buphthalmos, is a familiar expression; the origin of this is assigned by the author either to a congenital or an inflammatory cause. On the other hand, the small eye, in the author's day, was called "pig's eye." The description given of this clearly applies to what has since more politely and classically been designated as microphthalmos.

Allusion is next made in a somewhat quaint announcement to the "eye bolted out." This is suggestive of an eye leaving the orbit one evening clandestinely, enjoying a carouse, and coming back late and unsteady to find the lids closed and locked with a padlock—with no one on the premises. Of course the author does not mean this; what he does mean, however, involves a paradox: "When the eye cometh out," he relates, "it falleth quite down: it happeneth either of an outward cause, as of a blow, a fall or strain in coughing, vomiting, blowing," and we are left to conjecture to what the blowing refers, whether of the wind, the nose, or the incidence of a vocal domestic cataclysm, which generally assumes a direction contrary to the law of gravity. Again, the falling down may be due "to an inward cause, as of some sudden falling down of humours, which looseth all the muscles and whole body of the eye, or of a great inflammation or other humour." The paradox is, when did the author or anyone else ever see a normal eye become spontaneously luxated as the result of a fit of coughing, an attack of vomiting, or a " blowing," whatever that may mean?

Diseases of the eye generally he classifies into those of the humours, the coats, the sinews (otherwise the nerves), and the muscles. Of the humours, the first to come under notice is the lens. We learn that it is subject to all manner of diseases, the most common being a dry " distemperature "—not a very informative expression. This " dry distemperature " causes a shrinking together and dryness of the humour, by which it—the humour, we suppose—becomes white, " and this is the disease," the author adds, " which the Greeks call glaucoma." The problem of glaucoma has still to be solved; environing the disease still, in the present day, is much that we should like to know. Meanwhile the author speaks only of its effects, of the lental appearances which accompany the disease, of the degenerative changes which secondarily follow a prolonged glaucomatous attack. He quotes Hippocrates as claiming that the disease seldom occurs except in old people, and the plaintive admission is made that " we judge it incurable." Despite the statement that the lens " is subject to all manner of diseases," the only other references thereto are confined to remarks upon the disturbance of the vision which arises when the lens is displaced, otherwise dislocated. No mention is made of cataract. But we must be patient—that is coming later on.

The account of the diseases of the white tunicle, conjunctiva, or sclera, is vague and fragmentary. Three of these are mentioned—namely, inflammation, pterygium, or the tail, and mortification. Among the causes of the first are noted smoke, wind, the sun, dust, open air, and the smell of onions—a truly heterogeneous symposium. If severe, the disease was called ophthalmia; if accompanied by much " puffing up," chemosis. Of pterygium there are said to be many kinds; it is described as a sinewy flesh which begins to grow mostly at the great corner of the eye, and thence spreads over the apple of the eye. The third disease, mortification, leaves something to be desired in the matter of identification. Taken literally, the term suggests gangrene of the conjunctiva or sclera. Apparently, however, mortification, as such, has nothing to do with the disease. On the other hand, the author defines it " as the bursting of the veins of the eye, causing the blood to settle itself under the white tunic, and the horny also, making all things seem red unto the eye." Some blow or fall may be the cause, " sometimes it is due to fullness of the veins internally and thinness of the blood "—that is all he tells us upon which to build an hypothesis as to what he means by "mortification." In some respects the description would apply to a subconjunctival hæmorrhage, in others to a hæmorrhage into the vitreous, but of mortification it is impossible to discern a trace.

Diseases of the cornea, we learn, include pustules, common, malignant, and cancerous ulcers, the retention of purulent matter called hypopyon, the scar, and the rupture. It is interesting to find that the term "phlyctenulæ" is employed to describe the pustules; these pustules, he says, "are like unto little bladders, proceeding of a thin and waterish humour which gathereth among the small skins of the horny membrane, and setteth them upon the stretch." He notes that ulcers of the cornea follow when the pustules break down. Seven varieties of ulcers are distinguished; one is said to be very filthy, the colour of ashes, resembling a lock of wool, and is hence called the woolly ulcer, indicating, presumably, the results of sepsis. He attributes to Galen the differentiation of the various forms, and then calls Galen severely to account for a "notorious fault," the point being apparently a matter of difference of opinion between Galen and himself. Allusion is made to other ulcers of the cornea said to be malignant; the form of the disease was known as noma: "it fretted and spread unto the muscles and eyelids." And there were cankerous ulcers, these being, we are informed, of the nature of canker. Scar, or opacity of the cornea, was regarded as a disease in itself: "The scar," we are told, "is a disease of the horny membrane, for it taketh from it its colour and clearness, making it altogether white: then it is called leucoma." Hypopyon is described as resembling "the scar," being "a collection of purulent water, possessing the black of the eye." A curious misconception occurs under the heading of rupture of the cornea. "When," it is said, "the horny membrane is bursten then it causeth a disease." But this disease is described as a particular disease in connexion with the grape-like tunicle or choroid. Rupture of the cornea, it is explained, causes the body or substance of the grape-like coat to fall down, of which falling down there were four varieties, differing in size. But this particular disease was not a disease, but a traumatism, the nature of which was obviously prolapse of the iris. It is worthy of note that the term staphyloma was used by our forefathers to indicate a large prolapse.

The iris not having at this time been accorded recognition, no mention is naturally made of the diseases to which it is subject. The author therefore confines his remarks upon the diseases of this region to the apple of the eye, and assigns them to those of the choroid. And here we must be prepared for a surprise. In the course of this narrative mention has occurred, upon several occasions, of cataract; but the author, so far, has never told us what it is. That information, we are now about to learn, and it conveys, what is perhaps not generally known, the disclosure of a fact, remarkable alike in its historical interest as well as unaccountable in the neglect which it shows of our forefathers' capacity to make use of their observation. "We define cataract," he says, "to be an obstruction of the apple of the eye, caused by an unnatural humour, which having fallen down thither, groweth thicker by little and little, betwixt the horny membrane and the crystalline humour . . . This humour at the first showeth like water, but in the end it thickeneth and resembles more an earthy substance." Thus, despite what the author tells us that "the crystalline humour is subject to all manner of diseases," cataract was not included as one of them. The truth, however, is that cataract, as a disease of the lens, was pointed out by Hippocrates, and so the fact was accepted until the teaching and influence of Galen swayed the conviction that Hippocrates was wrong. The effect of this was that for many generations afterwards the Hippocratic view was forgotten; it passed out of knowledge, and is not even mentioned by Laurentius. It was not until more than sixty years after this book had been written, namely in 1656, that Lasnier and others reaffirmed the accuracy of the observation which Hippocrates had made. Even then the truth escaped universal recognition, and it was not accepted until the early part of the eighteenth century, through the publications of Maitre-Jean, Brisseau, Heister, and others. And so we have to admit the remarkable fact that a truth evolved by Hippocrates in the course of his life (B.C. 460-357) was denied and an error substituted in its place, for more than 2,000 years. Surely such a testimony as this of the greatness of the father of medicine is one more convincing proof of the genius that he was.

In referring to cataract Laurentius expressly states that glaucoma was a different disease, because it "happeneth through the congelation of the natural humours of the eye," whereas cataract was due to an unnatural humour, the sources of which seem to have been most varied and weird. This humour sometimes came from the brain, by means of the sinews, the veins, or the arteries, but how it could come from the brain through such channels raises some difficulty of imagination. Reference is made to the varied effect of the incidence of cataract upon the vision, from which we can gather that polyopia, one of its forms, had been recognized and noted. When at last the conviction became forced upon the minds of our forefathers that the lens was the seat of cataract, the procedure, by couching, was accepted as the means of removing it. Who the first "coucher" was, or by whom the operation was first introduced, does not seem to have been recorded. But the method quickly came into practice, and, somewhat surprisingly, with fair success; while evidence is forthcoming to show that, in professional hands, every effort was made to perfect the operation and perform it with skill and judgment. And yet we find that it soon passed into the hands of quacks. Itinerant mountebanks traversed the country, and in the market-places of country towns placed themselves upon platforms and appealed to the deluded populace with cataracts to have their blindness cured. Thus, in full view of the assembled crowd, and under such circumstances, couching was frequently done. In "Bannister's Breviary" we find some poetical attempts to record the situation, so far as quacks were concerned. Here is one:—

> "Yet they that very hardly
> Teeth can draw,
> Unless they spill much blood
> Or break a jaw,
> Will deal with eyes
> And boast of famous facts
> They have performed
> In couching cataracts."

And here is another, but obviously it refers to the skilled practitioner:—

> "Little cloudy vapours,
> These the eyes o'cast;
> Yet vanisheth as the dew
> By sun at last.
> Long practice, careful skill,
> With observation,
> Will teach the mystery
> Of the operation.
> To end this work,
> That perfect it may stand,
> God guide, with careful skill,
> Our eye, our heart, and hand."

These quotations are quite praiseworthy as poetical efforts; moreover, they convey, with their verisimilitude, a realization of fact which requires no exercise of the imagination to confirm.

Of the three diseases of the apple of the eye, according to the author, of which cataract was one, we have now to consider the remaining two. These relate—the author will excuse us for saying so—to the pupil.

This becomes, as we are informed, "too broad or too narrow, or else altogether shut up." The term still in general use, "mydriasis," is employed to express dilatation of the pupil, and the author, in his sixteenth-century composition, draws attention correctly to the effect upon the vision, so far as light is concerned, which a fully dilated pupil causes. The explanation, however, given of the incidence of the dilatation is vague and unconvincing. He attributes it to too much moisture of the grape-like tunicle, or to the opposite extreme, too much dryness. The resiliency of his pathology under difficult circumstances is a matter obviously worthy of attention. Further, we are told that abscesses and other fluxes falling upon the eye cause the membrane—that is, the iris — to become trussed up into a narrower room. This disease, namely, contraction of the pupil, he affirms is known as phthisis, quaintly referred to "as consumption or straitness of the apple of the eye." The cause is attributed to the falling together of the edges of the grape-like coat arising from a great store of moisture, which is nowhere else except on the side of the hole. What the effect of this description would have upon the mind of his noble patroness space does not permit of conjecture. And yet we may infer that the appearances he describes represent the results of a chronic irido-cyclitis, with an occluded pupil, and posterior synechiæ, followed by atrophy of the globe from arrest of the nutrition of the eye.

The account of the diseases of the muscles can scarcely be said to be illuminative. Perhaps the author, after his previous efforts of compilation, had now passed into a diffident mood, and thus has failed to do justice to his knowledge. Perhaps, again, he has told us all that he knew, or, it may be, he concluded that the subject would fail to interest his patient of uncertain age, whose eyes were not subject to any muscular defect. Nevertheless, we learn that the diseases of the muscles of the eye were principally three, namely, the arrested eye, the shaking eye, and the astonished eye. The first was called strabismus, and was caused by a palsy of some of the muscles; but whatever the effect of the palsy, the disease was due either "to dryness or to superfluous moisture." Here again is the repetition of a condition which so frequently before has done duty for the author's pathology; and yet between the lines we may surmise that by the arrested or strabismus eye was meant the hypermetropic eye. The shaking eye, we are told, meant a fault in the muscles which prevented them from keeping the organ still. This, no doubt, appeared to be a natural explanation to our forefathers, but, as we know in these days, nystagmus has a very different origin. Further, we read that all the ancient writers believed that the shaking proceeded from a seventh ocular muscle—that which surrounded the optic nerve. "However they deceived themselves about this muscle, as I have said," adds the author. His own explanation is that the shaking is caused by the muscles losing their fibres, whatever that may mean. After this follow some remarks which are of distinct interest. They apparently apply—though he does not tell us—to the astonished eye, namely to a disease which "is clean contrary" to the shaking eye. In this the muscles have lost all their power, causing the eye to become immovable, due "to obstruction or palsy possessing the sinews which bringeth motion." From this it is easy to gather that our forefathers had observed cases of ophthalmoplegia externa.

We come next to diseases of the optic nerve. These are said to be due to the following causes: obstruction, compression, the palsy, the falling and bursting thereof—presumably of traumatic origin—a hard and melancholic-like humour and inflammation. "All these diseases," he notes, "of the sinew of sight do make one common disease called by the Arabians, 'gutta serena.'"

The chapter concludes with a few remarks which lead us into a new realm of sixteenth-century teaching. He tells us that "the best learned physicians" regarded the eye as possessing spirits—spirits which were peculiar to the organ. There was obviously no intention to imply that these were of a special alcoholic nature, although no explanation is given of what these spirits were supposed to be. What we do learn, however, is that they were subject to diseases, and these diseases were apparently two, namely, myopia and nyctalopia. Criticism is absolutely disarmed in the contemplation of these examples of spiritual pathology, and yet the author gives us a very fair description of what is meant by the two terms in question. Speaking of the former he says: "One cannot see but in the dark, as in the dawning of the day, and in the twilight, while at midday the light is too great for a man to see to read." The description clearly applies to what came to be known as hemeralopia, or, in order to avoid confusion of terms, day-blindness. Of nyctalopia he says: "In this it falleth out clean contrary, for the disease prevents a man from seeing except in very clear light, and this has all to do with the spirits, the difference depending upon whether they be subtle, and thin, or gross." It need scarcely be said that hemeralopia and nyctalopia are merely terms expressive of symptoms, but why myopia should have been the term employed to indicate the former does not appear to be plain. As night is the opposite to day, and as it cannot be said that myopia has anything to do with either, it is somewhat curious that the "best learned physicians" should have confused the points and overlooked the introduction of the term hemeralopia, one which subsequently came into use. Incidentally, it may be recalled that these terms now represent the exact opposite to the meaning they were first intended to convey. Hemeralopia is now night-blindness; nyctalopia is day-blindness. The fact that this is so has generally led in this country to the exclusive use of the English equivalents in order to avoid the confusion which a change in custom has created. The reference, however, to this subject is interesting from another point. It brings under notice the use of the term "myopia" in an entirely novel sense from the point of view of modern conceptions.

The scope of the next chapter will be gathered from its headlines: "A general and most exquisite regiment [*sic*] for the preservation of the sight, in which is handled, very particularly, whatsoever may hurt the eyes, as also whatsoever is profitable for them." But the limits of this paper do not permit the scrutiny upon any extended scale of the author's views upon this subject. Briefly, however, a few quotations may be given in regard to which quaintness is the chief attraction.

First, the author lays great stress upon diet as a means of preserving the sight. He tells us that "the sight is strengthened by eating the flesh of the pye, the swallow, the goose, of vipers well prepared, of the wolf, of the he-goat, *and other ravenous birds*." Critically he adds: "The Arabians hold that the eyes of living creatures comfort the sight, but I know not by what property or sympathy." Fish, we learn, "is enemy unto the eyes, especially such as be salted, but trout, rockets, those which have a fast flesh, are not harmful; new and soft eggs with a little sugar and cinnamon marvellously clear the sight, but they must not be fried with butter." One more quotation may be recorded; it includes advice such as would surely frighten a patient should he believe that the preservation of his sight depended upon its rigid observance. "It is good," we learn, "to go to bed three or four hours after supper and rise early." The injunction to rise early is judiciously based, having regard to what follows; the person after rising "must walk up and down the chamber, hack and spit, clean the ears, empty the body of his ordinary excrements, then comb the head, and that always against the hair, keeping it very clean, and not wash the face and eyes with cold water, as is the custom, cold being an enemy to the eye and brain, but to use instead a little white wine, warm, with some fennel and eye-bright water." Imagination suggests the time which these instructions would consume in their accomplishment, exclusive of wooing the will, notoriously fickle, of a rebellious alvine excretion. Nevertheless, a general soundness of the precepts cannot be disputed. Moreover, principles are inculcated which are praiseworthy in the cause of hygienic laws.

The last chapter in this entertaining treatise is now reached. Its subject is the all-important one of treatment, and here we must be prepared for surprises. Plato, in one of his Dialogues, laid down that the first thing to do in treating the eyes was to treat the brain. Evacuation of the brain was the first thing to be accomplished. This process was attained by a purgative pill, of which aloes, amid a host of various ingredients, formed the chief constituent, rhubarb forming a good third; the process also included a campaign directed against the mouth and nostrils, "which are the ordinary drains that Nature hath ordained for the cleansing of the brain," as the author informs us. "Mastica tonics" were therefore ordered for this purpose, and the essence of fennel was rubbed into the palate. The brain was also evacuated by the insensible transpiration which followed rubbing the hair the wrong way with perfumes and bays. Hippocrates had a predilection "for cupping glasses applied to the neck, and hinder part of the head or the shoulders and thighs." Cauteries were also much resorted to, applied to the top of the head, but the author was opposed to this practice. He had seen fearful accidents to the pericranium to result therefrom. Again, he held that the cautery must not be applied over the occiput. That was the territory which by right belonged to the seton; the proper place for the cautery was "behind the ears, where it was possible to evacuate, both sensibly and insensibly, the whole body, the head, and the eyes." And here follows a paragraph worthy of the highest praise. This sixteenth-century author displays a wisdom for which he may be congratulated: "I have not," he writes, "spoken of blood letting, because there is not any place for it here, and it is so far off from profiting them which are weak sighted, that it weakeneth them more, taking away blood, which is the storehouse of nature and that juice whereby it is most cherished. And yet in great pains, inflammations, and sudden fluxes of humours it may do good."

In the copy of this book in the library of the Royal Society of Medicine the lines of this paragraph are under-marked, and in the margin of the page there is drawn the outline of a hand, with a long, straight forefinger warningly directed towards the advice conveyed.

The faded ink of these unauthorized delineations suggests that they were made by a reader at some period in the long and distant past, who, impressed with the value of the remarks, was desirous of emphasizing the teaching, sound and convincing, of which they were the subject. The first line of treatment being, as it has been said, to evacuate the brain, the next was to strengthen, we are told, the brain and the eye. For this purpose opiates, lozenges, and powders in variety were used. But what was greatly commended and prescribed in this regard was the domestic commodity treacle, especially for those whose brain and eyes were "rheumatically inclined." It is curious to read in these days of "digestive powders" being recommended to be taken after meals; they contained fennel, coriander, citron, and miroblanes. Such comprised, mostly, the internal medications used in the treatment of eye diseases. Of local treatment the following is the description "of one of the most exquisite and best approved lotions," as the author is careful to observe. "The leaves of fennell and eye-bright and several other herbs are shred very fine, and then macerated in white wine; to this is added some urine of a young boy in perfect health, as well as some woman's milk, also some honey." This repulsive mess was afterwards distilled and a drop applied to the eyes every morning. At the bottom of page 70, in this chapter, we come across another hand in the margin, obviously the work of the same artist and reader as the first mentioned above. The thumb, in this instance, is used as the indicator. But the paragraph to which it directs attention merely refers to a lotion compounded of white wine, rose-water, nutmeg and mace, which had to be left twenty days in the sun before being used. On the following page a third hand is noticeable. A long, bony-like forefinger is pointing obliquely downwards in the direction of a paragraph descriptive of the preparation of hog's grease and rose-water, with certain additions, most of which belong to the therapeutic armamentarium of mediæval times. In a concluding paragraph the author thus expresses himself: "Lo, these be the means whereby we shall be able to preserve the sight, especially if the diminution thereof come by some great moisture of the brain and eyes, as is that of my Lady's, the Duchess of Uzez, to whom this whole discourse is particularly dedicated. I do not set down the remedies which are proper to the several diseases of the eyes, for so I should spend too much time. It was my purpose only to prepare this general regiment [*sic*] which might serve as a pattern for the curing of all the rest. Monsieur Guillemeau, the King's Surgeon, hath put forth a very learned treatise, wherein the most exquisite remedies are set down and used by the old and new writers. Unto this book I refer the reader, seeing it is extant in our common language." And so, with this generous recommendation of a colleague's talents, we come at last to the end of the seventy-one pages of the discourse upon the preservation of the sight, compiled by a sixteenth-century oculist.

A few final remarks may now be added concerning the life of Laurentius. He was born at Tarascon, in France, in 1558. Of his parentage, his father was a medical man and his mother a Castellan, sister to the Physician-in-Ordinary to Henry II, Francis II, Charles IX, and Queen Catherine de Medicis of France. In 1575, when Laurentius was aged 17, his mother was left a widow with eleven children. And here it may be said that the family must have been one exceptionally gifted. Of her sons, all of them achieved fame. Two became archbishops; another son, Richard, rose to the position of Physician to Louis XIII; another embarked upon politics and became a French Senator. But Andreas, perhaps, was the one who reached the greatest fame. Studying medicine at Avignon, he passed into the ranks of the profession in 1578. Subsequently he joined the School of Medicine in Paris, for further professional education. In 1582, while still a young man, aged 24, he applied for the vacant Professorship of Physic at Montpellier University. For this post he was nominated by the then University Chancellor. Various objections, however, were taken to the nomination, mostly upon the grounds that he had no claim upon the University. He had neither been a student there, nor had he graduated. At first his opponents gained the day against him, and the nomination was annulled. Nothing daunted, however, he made a valiant fight against this decree, and eventually he triumphed. At least it is certain that Laurentius was able to announce himself as Professor of Physic at the University of Montpellier in 1583. About this time he appears to have come in contact with his noble patroness, the Duchess Uzez, in consequence of which thereafter the whole course of his life was changed. For many years apparently she became so much a part of his life that he regulated his actions in accord with her bequests. The interest she took in him was based upon gratitude. At one time he had done her a great service by curing her of a grave malady, which service ever afterwards became an obsession, creating an indebtedness compelling a sense of duty that she must advance his interests to the best of her power. In time she wooed him from Montpellier upon the promise that she would introduce him to the King, and so gain for him the commanding advantages of the patronage of the Court. This promise was shortly afterwards fulfilled, under circumstances most favourable for its full fruition. The King one day became ill; the Court physicians failed in their efforts to deal with the malady; the duchess thereupon insisted upon Laurentius being called into consultation. This advice was accepted by the King, with the happy result that the treatment advocated by Laurentius soon restored his royal patient to health. "There," said the duchess to the King, "that is what my physician can do. I will give him to you; but"—half playfully, half seriously—she added, "you cannot have him until I am dead." She died in 1596. After the death of the duchess Laurentius became Physician-in-Ordinary to the King—an appointment which apparently was created for him as a special mark of the royal favour. From the first the King, apart from the evidence in his favour, took an interest in Laurentius, after having heard that he was a nephew of a Castellan. On the marriage of Henry IV, in 1600, Laurentius was also appointed Physician to the new Queen. Then, three years later, came further preferment. Laurentius was nominated to the post of Chancellor of the University of Montpellier, which he accepted, and in 1606 the supreme honour was conferred upon him of "Premier Médecin" to the King. Laurentius did not long survive this additional and final advancement. He died on August 16, 1609, at the comparatively early age of 51, and, nine months later, his royal patron and friend was assassinated—a king who has been described as "one of the best princes that ever occupied the throne of France, one who was brave to excess, sensible of the genuine glory of a king; one who consulted only the benefit of the nation over which he presided." And thus was brought about an irreparable loss to France by means of the knife of a bloodthirsty fanatic.

In reflecting upon this brief survey of the life of Laurentius, it is obvious that his career was largely favoured by fortune. Full justice, however, should be assigned to those attributes he possessed contributing to his success. He was clearly a man of notable ability; he exhibited at the same time a force of character and a personality which made him attractive and distinctive. He must have been gifted with that peculiar and special *ménage* of disposition, without which Court favour is impossible. In this regard, what was true in the days of Laurentius is just as true now. Skill, ability—even the commanding influence of surpassing endowments—weigh but little in comparison with a manner which excites no discordant note in the personal relationship of a subject with his sovereign. Friendship, confidence, and royal regard are cemented upon that one acquisition, an acquisition which, after all, merely meets a demand based upon human nature. Thus Laurentius, judging from the adoration shown him by his noble patroness and the supreme royal favour which he enjoyed, must have possessed a manner soothingly complacent to his exalted patients, a supposition which is also confirmed by what his contemporaries said of him, that he was a man loved and appreciated by all.

Laurentius contributed largely and diversely to medical literature. He wrote upon Gout, Leprosy, Struma, and other subjects. But his fame as a medical writer rests upon his magnum opus, the "Historia anatomica humanis corporis." The best edition of this is the one published in a separate volume in Paris in 1600, and exclusive of his other works. The Library of the Royal College of Surgeons possesses such a copy, with a portrait of the author on the title-page. This volume, mainly because of its plates, is a marvellous example of a professional work, for therein lie buried, uncared-for, unknown, masterpieces of the art of engraving, in the contemplation of which the eye lingers with delight, inspiring, at the same time, a sense of admiration for such exquisite examples of an art, an art distinguishable through ages past and present for an attraction peculiarly its own.

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*February* 15, 1916.)

Folk Cures by Constriction and Rings, with a Digression into the Nature of the Soul.

By DAN MCKENZIE, M.D.

ONE of the fascinations in the study of folk-medicine consists in the ferreting out of the primitive medical practices which passed into orthodox medicine to linger on, some of them, almost even to our own days.

Some of these practices are discernible in the constriction cures so common in primitive and ancient medicine, an example of which is still prevalent in England in the popular practice of tying a tight garter round the leg to prevent cramp. In addition to constriction cures proper, we may also take this opportunity of referring to band and ring cures, like the anti-rheumatic finger-ring, which is still obtainable for one shilling at any chemist's.

At first sight, cures like these seem as if they had originated simply in charms, and there can be no doubt that some of them did actually begin in this way. But a closer acquaintance shows us that many of them have a much more complex and interesting origin than that. As in other departments of folk-medicine, the idea of the charm or amulet is met with in this group, but it is not, as I hope to be able to show, the sole origin of the custom.

To begin with the ligature remedy for pain—e.g. the garter cure for cramp. Here, it is obvious, we are dealing with what, in the first instance, is a simple and rational practice, seeing that pressure and constriction actually do relieve pain. And instances of ligature cures of this kind are plentifully to hand from all countries, savage or civilized. For example, in Sumatra, as Bartels points out, as well as in Western Europe, a band or cloth twisted round the head is a common cure for headache. In addition to this simple and rational type, however, there are others the meaning of which is not so readily apparent.

First of all, still keeping to the purely physical varieties, there is the large group in which a constriction is applied with the definite object of forcibly restraining growth in bulk, and of these the best known is the obstetric binder or girdle of pregnancy. The girdle of pregnancy has an extensive distribution both in time and in space. As is well known, the women of ancient Greece and Rome were in the habit of wearing a body belt or girdle during pregnancy, and the same is true of the women of Phœnicia, for the symbol of Astarte was a girdle. Assumed at the eighth month of gestation and worn until parturition, it was then laid aside, for which reason one of the attributes of Artemis[1] in Greece and of the Roman Diana was "the girdle-loosener" (Solvizona). In later times the custom met with criticism, however, particularly from Soranus of Ephesus (A.D. 100), who recommended that it should be worn only up to the eighth month and then discarded, in order, as he said, that the weight of the child might aid in bringing on labour at the proper time.

The obstetric girdle was in universal vogue in Europe at one time. Mention is made of it in France in the days of Ambroise Paré, and we are still reminded of it in the French word *enceinte*, as well as in the German word *Entbindung*, which shows that the ancient Germans, like the Greeks and Romans, laid the girdle aside at the onset of labour. Naturally enough, the girdle came to bear a mystic or semi-sacred character, or it had that quality added to it. Thus, in mediaeval England the girdle of Abbot Robert of Newminster had the power of ensuring that women who wore it would have an easy confinement.

The Ossianic poems allude to a girdle which had similar properties, and there are said to have been in the North of Scotland obstetric girdles inscribed with mysterious figures which were preserved as heirlooms in certain of the old families. I do not know whether the girdle still lingers on in that part of the country, but in the Lowlands of Scotland and in England the practice seems to have died out.

---

[1] The Athenian women at their first confinement dedicated the girdle they had worn to Artemis, placing it in her temple.

In France, however, we hear of mystic girdles as being in use as recently as 1886. The sisters of St. Ursula, of Quintin, Côtes du Nord, "own one of the chief educational seminaries in Brittany. And when a young lady whom they have educated gets married and is about to become a mother, the pious sisters send her a riband made of white silk, decorated by the clever brush of the best caligraphist in the community with a beautiful inscription in blue letters. Before sending it off the sisters bring it carefully into contact with the reliquary in the parish church, in which is preserved a precious fragment of the very binder which the Holy Virgin herself wore, as a number of unimpeachable parchments clearly certify. The inscription in blue letters on the riband reads: '*Nôtre Dame de Délivrance protégez-nous!*' The young lady who receives the blessed riband is instructed to put it around her body in order that her accouchement may terminate happily."

Turning now to extra-European countries, we find the girdle in common use. Its use in Japan deserves a special mention. The first we hear of it is, strange to say, in an account of a Japanese Embassy to Rome (probably a fruit of the early Jesuit mission to Japan by St. Francis Xavier) as far back as A.D. 1586, by a certain Guido Guetteri, a Venetian:—

"As long as they are not pregnant," he writes, "the binder worn by Japanese women is large and easy, but as soon as they perceive that they are gravid they tighten up this bandage so forcibly with a string that one would almost expect them to burst. 'And yet,' they say, 'we know by experience that if we do not do so we have to endure a very severe labour.'"

The Japanese binder was strongly condemned by the reformer Kangawa, from whom we learn that it can be traced back in the historical records to about A.D. 1180. As a result of Kangawa's sensible opposition, the obstetric binder in Japan has now fallen into comparative desuetude.

The girdle is worn in China. And in Burma, as in ancient Rome, a tight bandage is applied at the beginning of the eighth month in order to prevent the womb rising, since the Burmese woman believes that the higher the child rises, the longer and more difficult will be the labour. Similar practices are reported as being prevalent among the women of Macassar, Celebes, Java, and Malacca, and also among the squaws of the Chippeway Indians.

Thus the origin of the girdle of pregnancy seems to lie, as we see from the more primitive instances, in the hope of preventing, by sheer physical force, the fœtus from reaching a size so great as to impede labour. Magical restraint does not seem to be thought of in any of the instances I have so far encountered, but that a religious, as distinct from a magical, modification of the custom comes into play is no more than one would expect. Popular customs, such as this was, always do take on a religious cast after a time.

Every modern medical practitioner is, of course, acquainted with the "binder" which is applied after the child is born, in which respect it differs from the ancient girdle of pregnancy. In spite of this difference, however, it is not unreasonable to suppose that the puerperal binder of modern obstetrics may be the lineal descendant of the girdle of pregnancy.

Apart from the girdle of pregnancy, cures do occur in which there is a magical extension of the notion that a constriction is physically capable of restraining increase in bulk. Tumours, and especially goitre, are treated in this fashion.

In Derbyshire, Lanarkshire, and elsewhere in Britain, as well as in Switzerland and Germany, a favourite method of restricting the growth of the enlarging thyroid of goitre is to bind a silk thread, preferably red in colour, three times round the neck. In Essex, for an "enlarged neck" they used to fasten a snake skin, sewn in a piece of black silk, round the neck for the same reason. The belief is akin to that recorded by Pliny that "if young twigs are made into a collar and put round a cock's neck it will never grow."

Psychologically such cures belong to the same order of magic as the "measuring" cures, and as that which enjoins the belief that if you pass your leg over a child's head you will stop it growing.

There is another form of homœopathic magic which may possibly have participated in the evolution of band and ring cures, and that is the well-known magical use of knots. But as I have been unable to find any instance in which the connexion is clearly manifested, I do not propose to spend any time in discussing it.

We turn now to another variety of the constriction cure, which, although similar in appearance to those we have just been describing, is quite different from them in its origin and nature. I refer to the constriction of the extremities in the treatment of hæmorrhage, the vogue of which is widespread.

In Scotland bleeding from the nose is, to this day, quite frequently treated among the people by tying a thread or a string tightly round the thumb.

In the province of Bari, in Northern Italy, menorrhagia is treated by binding a rope round the waist, the wrist, and the ankle of the patient, and, if that fails, then threads of black wool are tied round each of the fingers and toes.

In Bavaria the same disorder is treated by encircling the little fingers of both hands with red silk thread, and as many times as the thread is wound round the finger by so many days is the duration of the discharge reduced.

So far as my reading goes no explanation of this method of treatment has hitherto been offered, and the custom has obviously nothing whatever in common with the modern rational practice of uniformly bandaging the limbs in the treatment of the effects of severe hæmorrhage. At first sight, indeed, the constriction treatment of bleeding would seem to be simply nonsensical or fanciful. But such a conclusion would be merely a confession of ignorance. There is always some kind of reason for every folk-cure.

My suggestion is that the constriction was applied in order to fetter the soul so that it could not escape from the body, and my reasons for this explanation, at first sight so far-fetched, will appear in the course of the following remarks.

PRIMITIVE IDEAS ON THE NATURE OF THE SOUL.

Nowhere, perhaps, in the whole range of folk-lore are the primitive ideas so fanciful and so pleasing as in that section of early psychology which has to do with the soul, and no ideas have proved to be so capable of expansion and development as these were; an expansion and development, which, of course, they underwent during the long course of their evolution under the care of the constructive philosophers.

In their crudest forms probably no very clear distinction exists between the idea of the soul and that of the life of a living being; at all events, we certainly must confess that it is difficult, if not impossible, for us to disentangle the ravelled ideas of early man on this subject. But, in its later developments, we may say that, speaking generally, ancient and civilized people seem to mean by the "soul" what we in these days should term the consciousness, or the Ego. While, however, it is true that in many languages the word for a "soul" seems originally to have sprung from the idea of a breath (*spirit*, *ghost*, *animus*, related to ἄνεμος, &c.), nevertheless the soul was no mere abstraction. It was, on the contrary, an actual physical entity, a material object, which, although perhaps so faint and shadowy as to be invisible to ordinary men, was yet quite plainly manifest to those with clearer vision, of whom, in the olden times, there were many.

Sometimes the soul takes the form of a copy in miniature of its owner—what the ancient Egyptians called the *Ka*. In many mediaeval prints, for example, depicting the death of certain people, there may be seen a small figure emerging from the mouth. This manikin, who is, so to speak, the *genius loci* of the human body, resembling the tree-spirit or the river-spirit of polytheism, resides within the body; in the head generally, sometimes in the chest. He never seems to be found below the diaphragm, where, to be sure, in women at all events, he would probably have found his claim to supremacy contested by another creature—namely, the uterus. Upon his behaviour the health of the owner depends to a large extent. In some parts of the world it is said that, if he falls down, epilepsy will result; if he is enticed away, and a dog's soul take his place, the host will suffer from hydrophobia, and so on.

But there is another and probably more widely distributed notion than this of the soul as a manikin, or *Ka*, a notion which is due to the observation that, like the uterus, the soul has a tendency to wander away from the body, slipping out by the mouth or nose. Fortunately such absence does not necessarily cause death, unless, that is to say, it stops away too long. No doubt when death takes place the soul does forsake its tenement, and for this reason some savages strive to keep their dying friends alive by stopping up the mouth and nose. But in the ordinary way, when the soul goes a-wandering, all that happens is that the owner falls asleep. Sleep, in other words, is the temporary absence of the soul, and dreams are the adventures it encounters while out of the body. At the same time its absence, albeit only temporary, is not wholly free from danger, as some accident may intervene to prevent its return. If the position of the sleeping body be changed, for example, or if some mischievous person disguise the sleeper, as when a moustache is painted on a slumbering lady's face—a shameful trick equivalent to murder in the eyes of the people of Bombay—then the home-seeking soul gets bewildered, and, like bees whose hive has been shifted, it is unable to find its way back into the body again, so that the sleeper dies without waking. For this reason, also, it is a dangerous thing to rouse a person suddenly from sleep, before, that is to say, the soul has had time to flit back again.

By a natural extension of this belief, illness, and especially illness characterized by a loss of consciousness, such as syncope, epilepsy, coma, and the like, is frequently attributed to the withdrawal of the soul from the body.

These ideas are early man's reply to the still unanswered questions: What is sleep? What is unconsciousness? What is death? And the answer, although it may strike us as naive, is by no means absurd or irrational. It is only another way of saying that there is a Something which comes mysteriously and as mysteriously departs; when it is present, the man is alive—he can see, hear, speak, move, and behave as a sensible being; when it is gone on a short journey, he is only half-alive, the body is warm and the breath comes and goes, but only in an automatic fashion; when it goes for good, all vital processes cease and the person dies.

By a simple process of what we call imagination or metaphor, but what the uncultured man regards as actual fact, this mysterious flitting entity takes the form of a winged creature—a bird, a bee, a moth, or a butterfly.

We have already seen that the Egyptian *Ka* represents the soul-manikin of early culture, but the Egyptians also found room in their theology for the winged soul, which they distinguished from the *Ka* and figured in the hieroglyphs as a man-headed hawk—the *Ba*. (The popular notion that the Egyptian *Ka* is the equivalent of the "soul" of modern European thought is an error. The Egyptians, as a matter of fact, divided man into no fewer than nine parts, including the physical body—*Khat*—a minuteness of analysis which has no parallel in any philosophy since theirs. It is true that attempts have been made to show that this nine-fold Egyptian structure is the same as the tripartite division of Græco-Roman and modern European philosophy into body, spirit or life, and soul or consciousness, but they are not convincing.)

In ancient Greece the soul was a pigeon or a butterfly. Pigeons, it was said, first made their appearance in that country at the time of the wreck of the Persian fleet off Mount Athos, and in other parts of the world also there are those who see white birds emerging from the waves when ships go down. The dove is, indeed, perhaps, the most widely distributed form of the soul. Its significance and importance in the Christian religion is evident from the facts that it was often carved upon tombstones, and that the Holy Spirit took the form of a dove. And the curious association of the dove with illness, and especially with death, is exemplified in the following excerpts from the folk-lore of the subject:—

Grimm notes that over the graves of the Lombards poles were set up with pigeons on them. (Just as the man-headed hawk is figured upon the ancient tombs of Egypt.)

Presumably, also, such beliefs are responsible for the practice of applying pigeons to the feet of the dying, as Pepys informs us was done when the queen of Charles II was sick unto death.

In Scotland, "pigeons were left fluttering in their dying agony against the dying man's feet." "Early in the morning a near relative would remove the pigeons and carry them to a place where the dead and the living did not cross, that is, to the top of a precipice," and there leave them (Black).

In many parts of England there is an old superstition that dying people cannot take leave of life on a bed of pigeon's feathers, and for a patient to ask for pigeons to eat is looked upon as a very bad sign. On the other hand, there is a popular belief in some mysterious nutritive value in pigeons and pigeon-broth for sick people. Again, Fernie records the belief that "it is considered a sign of approaching sickness if a pigeon comes and accidentally perches on a table; and, if on bed or a chimney-piece, of death, especially if the pigeon be a white one."

English medicine in the seventeenth century considered pigeons valuable in palsy and for aged and phlegmatic men—supplying them, as it were, with life.

There is a superstition in many parts of England, particularly in the West Country, that dissolution cannot take place unless the window is opened to allow free egress to the soul. A prolongation of the death agony is due, it is supposed, to the vain efforts of the soul to escape, and in order to put an end to the suffering, the window must be opened, when the struggling soul will emerge and the sufferer be at rest. That the death-agony can be shortened by so doing is a fact, as I can testify, the reason probably being, as Sir Lauder Brunton pointed out many years ago, that the lowering of the temperature in the room when the window is opened administers the *coup de grâce* to the patient. It is said, also, that the attention of the watchers is drawn to the window by a dove tapping at it, the dove being the means of carrying the soul into space.

In the estimation of the meaning of folk-cures and practices regard should be had only to their general trend. When we descend to particulars we lose ourselves in a maze of inconsistencies and contradictions. Thus in the above, the pigeon is seen to be at one time a danger, at other times a safety. But the general tendency is clear enough, and shows that the pigeon was connected with death, or, in other words, with the flight of the soul.

In this connexion the marvellous image, or vision, of Plato, that greatest of mystics, comes to our recollection, where he figures the soul as a bird-like creature, which in its sojourn in the flesh, and its contact with sin and the world, tends to lose its sustaining plumage and to become a mere denizen of lower space—being "earth-bound," to use the modern theosophical phase—but which also, by the love of wisdom and the exercise of well-doing, may acquire new wings wherewith it may soar into the lofty and ethereal realms of truth with the sureness and power of the eternal gods themselves. For every sin committed, so to speak, a feather is lost, and with it a modicum of buoyancy; while, on the other hand, with every good and noble thought or deed, a new feather is obtained and fresh buoyancy acquired. Here, also, we may recall, as fundamentally akin to the Platonic idea, the Egyptian doctrine of the weighing, in the presence of the gods, of the heart after death by Thoth, against a feather. And so we see how philosophical and religious beliefs and aspirations of the most sublime character may occasionally spring from what we have been long accustomed to regard as nothing but the vain and empty superstitions of vulgar and ignorant people.

Another beautiful idea is that of the Greeks, who saw in the butterfly (ψυχή) emerging from its chrysalis the soul (also ψυχή) issuing from the body at death, a belief which, although employed metaphorically, or as a type by the Platonic philosophers, was in the popular mind of the time an actual and genuine occurrence.

We may observe, in passing, that both Germans and Romans differentiated the soul from the mind; ψυχή, *animus*, the soul, and νοῦς, *mens*, the mind; while *anima*, life, is akin to ἄνεμος, wind or breath. *Animus* and *anima* are "next door to each other," as Grimm says.

In the uncivilized races of the present day the idea of the soul as a winged creature is very common indeed, and Frazer gives a long list of examples.

The bee, also, is met with in some old Scots tales creeping out of a sleeper's mouth and flying away into the dream-world.

The next step we take in our inquiry brings us within sight of our goal, for it has to do with the curious association of the soul with the blood. Obviously the connexion is due to the fact that bleeding tends to end in the flight of the soul, or in syncope and death. The soul, as Grimm says, "has her seat in the blood, and as that ebbs away, she escapes with it," and from this natural observation there spring, he suggests, the pretty myths of flowers or trees growing out of the body after death. Drops of blood turn into yellow flowers, as from the blood of Ajax a herb sprouted. Further, one of the old German sagas speaks of the soul flowing away out of the body, while, in the "Iliad," the soul escapes through a gaping wound, as if it were, so to speak, an extra mouth. Then there is the ancient Hebrew doctrine that "the blood is the life," and Sallust's remark (for which I am indebted to Fernie), "*Sedem animæ in extremis digitis habent.*"

Here we tread very close upon the heels of the old medical belief that the arteries contained the soul, but caution forbids me claiming this as an offshoot from the more ancient idea, in view of the explanation usually given that this belief arose from the observation that after death the arteries are found to be empty.

We have been dealing principally with the departure of the soul, but there also arises the equally interesting question as to the time of the arrival of the soul in the body, a question which during the Middle Ages was, for religious reasons, a warmly debated topic of discussion.

According to most folk-beliefs the soul enters the body at birth, but in many places its advent is believed to coincide with the quickening of the fœtus *in utero*.

The soul, then, being bird-like in nature, and liable to embarrassing and perilous absences, it becomes important to devise a means to prevent its escape. For this purpose what could be better than a snare or a tie of some kind?

On the return of a Burmese or Shan family from a funeral, a tendency has been noticed for souls to take flight. In order to prevent such a calamitous ending to an already sorrowful enough occasion, the old men are careful to tie strings round the wrists of each member of the bereaved family.

Bartels figures a soul-snare which the Harvey Islanders employ when they wish to compass the destruction of an enemy. It consists of a series of rings or loops made of rope, which is hung upon a tree in the neighbourhood of the intended victim. When that unfortunate man catches sight of this magical gin, knowing only too well what it means, he returns to his dwelling, lies down, and very soon gives up the ghost in real earnest.

This kind of knowledge gives to us a fuller understanding of the Psalmist when he says: "Our soul is escaped as a bird out of the snare of the fowler; the snare is broken and we are escaped."

We have already cited instances of ligature cures. Here is another in which, it is interesting to note, the fear of bleeding is not present. "The Minaugkabauers, of Sumatra, fasten a skein of thread or a string round the wrist or loins of a woman in childbed, so that when her soul seeks to depart in her hour of travail it may find the egress barred" (Frazer). And finally, here is the same cure, in which the fear of hæmorrhage is said to be the reason for the ligature. In Franconia, and also in other districts of Germany, a rather common practice is the binding of the arms and legs at the elbows and knees during labour in order to hinder bleeding. One often hears a trifling *post-partum* hæmorrhage credited with being the cause of diseases which appear later on (Ploss and Bartels).

It is interesting to note, in conclusion, that the ligature cure was practised by ancient and mediaeval doctors of good standing. Paulus Ægineta, for example, treated deliquium animi (which Adams translates by "the absence or want of the soul"—evidently what we nowadays term "syncope" or "fainting") by ligatures round the arms or legs, and the same method was recommended by him for epistaxis and hæmoptysis, while he gives it the first place in the treatment of menorrhagia.

FINGER-RING CURES.

The popular custom of wearing rings for rheumatism is also very ancient. I am inclined to look upon this particular cure, however, as different in its origin from the soul-strictures we have just been discussing. Probably it sprung from the wearing of charms. For in the early times jewellery in general, and finger-rings in particular, though often doubtless worn simply for adornment, were also frequently made the vehicle of charms, as King has pointed out. Naturally, a band or ligature would be held to be all the more efficacious if the material of which it was composed was made of some magical substance like red silk; if the bandage was decorated with religious symbols; if the ring was composed of some rare or curious metal; or if it bore in a setting a scarab or blood-stone, or some such potent jewel.

An example of this kind of polypharmacy is afforded by the following from the "Compleat Housewife" (eighteenth century):—

"*To make Necklaces for Children Cutting Teeth.*—Take roots of henbane, or orpin and vervain, scrape them with a sharp knife, cut them in long beads and string them green; first henbane, then orpin, then vervain, and so do till 'tis the bigness of the child's neck. Then take as much red wine as you think the necklace will suck up and put into it a dram of red coral, as much peony-root finely powdered. Soak your beads in this twenty-eight hours, and rub the powder on the beads."

Many of the herbal remedies, like henbane, orpin, and vervain, owed their reputation to qualities magical or mystical, and not, in the first instance, at all events, to any actual pharmacological effect or true therapeutic power. In many cases, as I have shown elsewhere, the real efficacy of the remedy remained undiscovered until patients began the habit of swallowing the herb in order to bring it more closely into union with the body and personality.

In conclusion, we may for convenience summarize the reasons which led to the use of strings and rings in medicine as follows:—

(1) Circular pressure, applied for the relief of pain.

(2) The same, applied with the object of physically restraining the continuing growth of a swelling or tumour.

(3) The magical extension of the last-named (related also to "measuring" cures).

(4) Bands and ligatures put on to prevent the escape of the soul.

(5) Religious or magical bands or rings worn as charms or amulets.

It is possible that the mysterious rite of circumcision may, in the first instance, have originated in an effort to avoid the real or magical effect of an anatomical constriction inhibiting a natural function, but to discuss this topic would lead me far from the subject-matter of the present communication; consequently, I prefer to postpone its consideration for the time being.

BIBLIOGRAPHY.

PAULUS ÆGINETA, the Seven Books of (Translated by Francis Adams), Lond., Sydenham Soc., 1843, i, pp. 327, 615.

BARTELS, MAX. "Die Medicin in der Naturvölker," Berl., 1893.

BLACK, W. G. "Folk Medicine," Lond., 1883.

BOUNEMÈRE, L. "Une Ceinture Bénie," *Bull. de la Soc. d'Anthrop. de Par.*, 1886, ix, III Sér., p. 753.

BUDGE, E. A. WALLIS. "Egyptian Ideas of the Future Life," Lond., 1908, 3rd ed., pp. 76, 163, 170.

FERNIE, W. T. "Animal Simples," Bristol, 1900, pp. 149, 153.

FRAZER, J. G. "The Golden Bough," Lond., 1900, 2nd ed., i, pp. 264, 271 *et seq.*, 401.

GRIMM, JACOB. "Teutonic Mythology" (English translation), Lond., 1900, ii, chap. xxvi, and iv, pp. 1094, 1166, 1778, 1802, 1817, &c.

KING, C. W. "Antique Gems, &c.," i, p. 377.

MCKENZIE, DAN. "Magic and Medicine," *Practitioner*, August, 1911.

PLINY. "Natural History" (English translation, J. Bostock and H. Riley), Lond., 1856.

PLOSS und BARTELS. "Das Weib," Leipz., 1902, ii, pp. 350 *et seq.*, and i, pp. 395, 785, *et seq.*

WILDE, Lady. "Ancient Cures, &c., of Ireland," Lond., 1890, pp. 14, 26.

(*March* 15, 1916.)

Sir John Finch and Sir Thomas Baines.

By ARCHIBALD MALLOCH, Captain C.A.M.C.

(SYNOPSIS.)

SIR JOHN FINCH and Sir Thomas Baines were seventeenth century medical men; but neither of them made any notable contribution to the science of medicine, nor did they ever publish anything beyond some verses in praise of the poetry of William Cartwright, which were published, together with the poems, in 1651. The interest of Finch and Baines lies in the very long and remarkable friendship which existed between them for a period of thirty-six years.

Last summer I was in charge of a small hospital for officers at Burley-on-the-Hill, in Rutland. The house now standing was built by John Finch's nephew, Daniel Finch, the second Earl of Nottingham and ninth Earl of Winchilsea, about 1700. Although Finch and Baines never visited Burley, several portraits of them hang on the walls, and many of their letters (some already published by the Historical MSS. Commission) were found in the house, together with their notebooks. I have thus been able, from these and other sources, to collect material for what may some day be a small book.

Thomas Baines, slightly the elder of the two, was born at Whaddon, in Cambridgeshire, in 1622, went to school at Stortford, and in the year 1638, following two brothers, entered Christ's College, Cambridge. In 1643 he took his B.A. degree.

John Finch was a son of Sir Heneage Finch, Recorder of the City of London, and was born in 1626. His brother Heneage became Lord Chancellor of England and first Earl of Nottingham, and his sister Anne married Viscount Conway, and was one of the most learned women of her time, and the "heroine pupil" of Henry More, the Cambridge Platonist. Finch was educated at Eton, under Norris, and at Mr. Sylvester's school at Oxford. In 1642 he entered Balliol College as a gentleman commoner, but, owing to the occupation of the city by the Royalists, he was in residence for a very short time, and because "there was scarce the face of a University left," he went to Cambridge and was admitted at Christ's College in 1645. Strange to say, he took his B.A. at Oxford in 1647.

Finch and Baines met at Christ's College, and thus began their unbroken friendship. In the year 1649 they both obtained the degree of M.A. Henry More was their tutor. In 1651 they both set out for Italy to study medicine, possibly at the suggestion of Dr. William Harvey. They made an extended stay in Paris and a tour through many towns of France. Finch kept a journal, and his remarks on the hospitals in Paris are of considerable interest. He writes: "The Hostel Dieu for the number of diseased is a famous hospital, but there's eight in a bed. But the Charité is the best accomadated that can be, as well as any gentleman in his own house . . . every man in a bed singly."

Finch was related by marriage to William Harvey, for Heneage Finch had married a daughter of Daniel Harvey, William's brother. John Finch, in a letter to his sister, gives an interesting story, and we doubt whether it has been brought to light before, but we cannot believe it any more than could young John Finch: "I was on Saturday with Sir Kenelm Digby where I had some philosophicall Discourse; and he had heard of your marriage, but wondered with me at the story of Dr. Harvey; I must confesse I have scarce faith enough to believe that he would Cutt himselfe, but rather believe he voyded that stone you spoke of then *(than)* cutt it out for I doe not see it was possible for him in two dayes to be able to goe abroad otherwise."

The friends studied medicine at the University of Padua, and Baines has written a very curious and somewhat mystical Latin poem to their Professor of Anatomy, Molinetti. Finch was made Syndic, or Vice-Rector, at the University, but refused to become Consul for the English nation, as he would have to be "drunk at least forty times in the year." In 1656 Finch and Baines both received the degree of Doctor of Medicine at Padua.

At Burley-on-the-Hill there is a large canvas of "Sir John Finch at his Studies." This was for some time thought to have been painted by Pieter de Hooch; however, a "pendant" picture hangs in the Hague of a woman reading in the vestibule of an Italian house, and this is by S. van Hoogstraten. The portraits are remarkably alike, and I throw out the suggestion that Anne Viscountess Conway is the lady of the Hague picture. This view is supported by certain passages in Finch's letters to his sister. Unfortunately, there is no trace of any other portrait of Anne Conway to compare with this one.

Finch and Baines are commemorated at Padua by monuments, bearing their arms and an inscription, in the Aula Magna.

In the year 1659 the friends moved into Etruria, and Finch soon attracted the attention of Ferdinand II, Grand Duke of Tuscany, and was appointed Professor of Anatomy at the University of Pisa. The Princes of Medici were noted patrons of science, and Finch debated vexed points in anatomy and physiology at the Court of the Grand Duke with Borelli, author of "De motu animalium." Malpighi was also at Pisa at that time, and, a few years later, Finch is said to have worked with Nicolaus Steno (Stensen). Finch is described by Fabroni as having shown the presence of lacteals in the mesentery, to have done work on the optic nerves of a certain fish, and to have carried out experiments on the cramp-fish (torpedine).

"The doctors" returned to England at the end of the year 1660, and Baines was appointed Professor of Music at Gresham College, as successor to Dr. Petty, in March, 1661. They were both made Fellows of the Royal College of Physicians, Finch was knighted by Charles II, and both had the degree of M.D. conferred upon them at Cambridge. Their signatures appear together amongst those who were "resolved to form a society for promoting natural philosophy," and in 1663 Finch and Baines were made "nomination Fellows" of the Royal Society. No papers by Finch or Baines were published by the Royal Society.

Sir John Finch and "honest Dr. Baines" spent much of their time in England with the Conways at Ragley, in Warwickshire, and at this time Finch writes of his "amours in Warwickshire," but it seems impossible to state who was the object of his attentions. Baines was never in love with anybody except Finch, and was a little selfish in this love affair of his friend, and persuaded Finch to drop his suit.

In 1665 Sir John Finch was made English Ambassador at the Court of the Grand Duke of Tuscany, and Baines accompanied him again to Italy. There are two portraits of Finch and Baines as young men at Burley-on-the-Hill, and two others which a tradition, handed down in the Finch family since 1750, ascribes to Carlo Dolci. Sir John Finch is represented as the Ambassador, holding in his hand an Italian document addressed to the Grand Duke. Baines is seen engaged on his work of making a "Collection out of Plato and Aristotle." He has the appearance of a man who has passed through a good deal of illness, and we know that he was troubled with gout and stone. Certainly Carlo Dolci must have been known to Finch, and, many years after these portraits were painted, Finch writes that he had bought "four pictures of Carlo Dolci," and one or two by that artist now hang at Burley-on-the-Hill.

The devoted pair returned to England in 1670, but Sir John Finch did not enter Parliament as he had thought he might. He sat on the Council for Plantations with Mr. Evelyn.

It seemed at this time that Finch and Baines would be forced to separate, as it was intended that Baines should be appointed one of a Commission to visit America and settle a dispute about the boundary between the provinces of Maine and Massachusetts. However, this appointment was not confirmed.

Sir John Finch was appointed Ambassador to Turkey in 1672 on the death of Sir Daniel Harvey. Dr. Baines was knighted in May of this year, and together they journeyed to Constantinople. The notebooks of Sir John Finch give a good idea of the life they led in Turkey and of their favourite occupation—"discourse" on theological subjects with "patriarchs of the Greek Church," Jesuits, &c. One entry of a conversation with the Venetian Ambassador, describing the post-mortem finding of a perforating ulcer of the stomach of "Madame," Henriette d'Angleterre, daughter of Charles I and Duchess of Orleans. Much has been written about the death of "Madame" by the Comtesse de la Fayette, and by Littré in his *Médecine et Médecins*, and it was thought for some time that she had drank of poisoned chicory water. This is one of the first cases in which such a pathological condition was described.

In September, 1681, Sir Thomas Baines died of "malignant double tertian," and Finch was sorely stricken, and writes that his tertian became a "double tertian" also. The body of Baines was embalmed, but certain internal organs were removed and buried in Constantinople, and Finch probably erected a monument with a long inscription in Latin over these "interiora." A MS. of the epitaph is in the British Museum. In it Finch describes their friendship at length, and pays tribute to the guiding influence of Baines and to his "great" learning.

Finch brought the body of Baines back to England on the *Oxford*, and buried his friend in the chapel of Christ's College in September, 1682. Sir John did not long survive Sir Thomas, and was buried in the same tomb in November, 1682. A large monument was erected, the expense being borne by Daniel Finch, second Earl of Nottingham, and, very fittingly, the epitaph was written by Henry More, who had been tutor to "the Doctors" thirty-six years before.

An illuminated copy of Finch's will now hangs in Burley-on-the-Hill. Together, he and Baines left a large sum of money to endow Fellowships at Christ's College, and to this day one speaks of "Finch and Baines" Fellows.

Section of the History of Medicine.

President—Dr. NORMAN MOORE.

(*March* 15, 1916.)

Some Plague Tractates (Fourteenth and Fifteenth Centuries).

By DOROTHEA WALEY SINGER.

CONTENTS.

CHAPTER … PAGE
Introduction 160
I.—The Tractate of John of Burgundy (Sir John Mandeville), 1365... 161
II.—The Tractate of John of Bordeaux, 1390 172
III.—The Epistle "Dilectissime Frater," before 1392 174
IV.—The Lost Tractates of John of Burgundy, before 1365 176
V.—Other Medical Works attributed to John of Burgundy, John à la Barbe, John of Bordeaux, or Sir John Mandeville 177
VI.—The "Compendium de Epydimia" of 1348 178
VII.—The Treatise of Johannes Jacobus, about 1364 179
VIII.—The Treatise of Bengt Knutsson, Middle of Fifteenth Century ... 183
IX.—Some Anonymous Tractates of the Fourteenth Century ... 185
X.—The "Missum Imperatori," 1371 186
XI.—The Tractate of Pietro de Tossignano, 1398 187
XII.—The Tractate of Blascus of Barcelona, 1406 189
XIII.—Two Anonymous Tractates of about the Middle of the Fifteenth Century 190
XIV.—The Tractate of John (of Speyer?), of about the Middle of the Fifteenth Century 191
XV.—Some Anonymous Astrological Tractates of the Fourteenth and Fifteenth Centuries 192
XVI.—The "Amicus Medicorum" of Jean Ganivète, 1436 193
XVII.—The "Anaglyphorum Florentis" of Nicholas de Dacia, 1456 ... 194
XVIII.—The Tractate of Giovanni Garzoni (between 1466 and 1477), from Niccolo Falcucci (died 1411) 194
XIX.—The Tractate of Thomas fforestier, 1485 196
XX.—The Tractate of Cristoforo Barziza, of Bergamo, about 1435 ... 197
XXI.—The Treatise of Giovanni Calora, between 1466 and 1484 ... 198
XXII.—The Treatise of Benedetto di Reguardati, of Norcia, before 1480 199
Appendix. The French Version of the Tractate of John of Burgundy 200

INTRODUCTION.

THE two centuries which followed the Black Death of 1348 saw a vast output of writings on the subject of the pest. This literature took the form mainly of short tractates, a few folios only in length, giving directions to the physician or to the populace as to their conduct in time of plague, and advice for the treatment of the stricken. Most of the tractates contain also a certain amount of theoretical material on the nature and origin of the outbreaks. The classics of medicine, works of Greek and Arabian origin, were held to be inadequate for the emergency, and the tractate literature represents the current medical opinion of the time and holds up a mirror to the practice of the late Middle Ages and early Renaissance.

Nor was the period entirely stationary as regards plague theory and practice. In the course of these 200 years, the doctrine of miasma shakes off its temporary association with astrology, while phlebotomy yields to other prophylactic and therapeutic measures designed to purify the "circumambient air" without and the "humors" within the body. The gradual process of development culminates in the magnificent Renaissance work, the "De Contagionibus" of Fracastor (1546),[1] which formed the staple of the doctrine of infection until quite modern times.

The conclusions here sketched are based on the study of some 100 MS. tracts,[2] supplemented by printed material, and especially by the valuable collection of tractates gathered by Professor Sudhoff.[3] It is proposed to examine in detail one typical fourteenth century treatise, and to note the divergencies from it, both as regards theory and practice, set forth in some other fourteenth and fifteenth century MSS.

---

[1] Hieronymus Fracastorius, "De Contagionibus," Venice, 1546.

[2] This paper is based on the British Museum Plague MSS. Some others have been used for purposes of comparison. The French version of John of Burgundy's treatise, from the Bibliothèque Nationale, has been chosen for publication in the Appendix on account of its early date and intrinsic interest, Latin versions of this treatise having already been published.

[3] Sudhoff, "Pestschriften aus den ersten 150 Jahren nach der Epidemie des schwarzes Todes, 1343," *Arch. f. Gesch. der Med.*, Leipz., 1909-16, ii-ix (in progress). Cf. also E. Wickersheimer, "Les Maladies Epidémiques ou Contagieuses (Peste, Lèpre, Syphilis) et la Faculté de Médecine de Paris de 1399 à 1511," *Bull. de la Soc. Franç. d'Hist. de la Med.*, Par., 1914, xiii, p. 21; G. Sticker, "Abhandlungen aus der Seuchengeschichte und Seuchenlehre," Giessen, 1908; C. Creighton, "History of Epidemics in Great Britain," Camb., 1891-94; A. Chéreau, "Les Ordonnances Faictes et Publiées à son de trompe par les carrefours de ceste Ville de Paris pour éviter le dangier de Peste, 1531, précédées d'une étude sur les épidémies parisiennes," Par., 1873; and J. F. C. Hecker, "Die grossen Volkskrankheiten des Mittelalters," Berl., 1865 (and earlier editions), English translation by B. G. Babington, 3rd ed., London, 1859. The more popular early printed leaflets on the plague are reproduced by Paul Heitz and W. L. Schreiber, "Pestblätter des XV Jahrhunderts," Strasburg, 1901 (for the most part single sheets). Many of these printed sheets have figures. Artistic and literary aspects of plague visitation are dealt with by Raymond Crawfurd, "Plague and Pestilence," Oxford, 1914.

(I) THE TRACTATE OF JOHN OF BURGUNDY (SIR JOHN MANDEVILLE), 1365.

The plague tractate selected as a type for more extended consideration bears the date 1365, and is by John of Burgundy, or John à la Barbe, who describes himself as citizen of Liége and professor of the art of medicine. He has a special interest for us, since the research of the last fifty years has fairly established his authorship of the original version of the "Travels of Sir John Mandeville."[1] It is told in the "Travels" that Sir John met in Egypt an extraordinarily learned and venerable physician, whom he calls Johannes ad Barbam. It was this bearded John, he assures us, who, by a curious coincidence, saved his life many years afterwards in Liége, when being taken extremely ill with arthritic gout, the knight had sent with all speed for the very best and most skilled advice obtainable! The distinguished physician, he adds, then suggested that Sir John should write down the story of his wanderings.[2]

Here, then, we catch a glimpse of the old Liége physician as he would fain have appeared to his contemporaries. The plague treatise is written in discursive and patchwork style, not unworthy of the author of the compilation known as the "Travels of Sir John Mandeville." It is not only one of the earliest of the plague tractates, but is also the parent of a whole host of variants and descendants, and provides a key to much of the literature.

---

[1] Cf. S. Bormans, "Catalogue de la Librairie de la Collégiale St. Paul à Liège," in *Le Bibliophile Belge*, Brussels, 1866, i, p. 236, and "Chronique et Geste de Jean des Preis dit d'Outremeuse," Brussels, 1887, i, Introduction, pp. cxxxii *et seq.*; E. W. B. Nicholson, *Academy*, 1884, xxv, p. 261; E. W. B. Nicholson and Sir Henry Yule, "Encyclopædia Britannica," 1883, article "Mandeville"; and, for the fullest presentation of the subject, G. F. Warner, "The Boke of John Mandevill, being the Travels of Sir John Mandeville, Knight, 1322-1356, a hitherto unpublished English version from the unique copy (Egerton MS., 1,982) in the British Museum, together with the French text," published by the Roxburgh Club, Westminster, 1889, with Introduction and notes. The subject is further discussed by Professor Hamelius in the *Trans. Bibliograph. Soc.*, Lond., 1916, xiii, p. 193.

[2] This tale occurs in the early printed Latin version of the "Travels" in 1480. (The British Museum copy bears the press-mark G. 6,700.) F. Hénaux, in the *Bulletin de l'Institut Archéologique Liégois*, Liége, 1860, iv, p. 159, quotes a similar passage from a French MS. (No. 360 of the Liége University Public Library, fo. 118), and from "the Latin version of Martins dé Alost, of the year 1491."

The contents of Johannes ad Barbam's tractate may be set forth thus:—

Title	[fo. 97 recto to line 3] (omitted in many MSS.).
(1) Astrological introduction	[fo. 97 recto, line 4, to fo. 98 recto, line 2].
(2) Personal introduction	[fo. 98 recto, line 2, to fo. 98 recto, line 23].
(3) Prophylaxis:—	
(*a*) General regimen	[fo. 98 recto, line 24 to line 29].
(*b*) Diet	[fo. 98 recto, line 29 to line 33, and fo. 98 verso, line 17, to fo. 99 recto, line 4].
(*c*) Disinfection	[fo. 98 recto, line 33, to fo. 98 verso, line 11, and fo. 99 recto, line 6 to line 9].
(*d*) Drugs	[fo. 98 verso, line 11 to line 16, and fo. 99 recto, line 9 to line 18].
(*e*) Phlebotomy	[fo. 99 recto, line 4 to line 6].
(4) Pathological theory	[fo. 99 recto, line 19, to fo. 99 verso, line 5, and in passages on fo. 99 verso, between line 5 and line 34].
(5) Therapeusis:—	
(*a*) Phlebotomy	[fo. 99 verso, line 5 to line 34].
(*b*) Drugs	[fo. 99 verso, line 34, to fo. 100 recto, line 10, and fo. 100 recto, line 17, to fo. 100 verso, line 14].
(*c*) Diet	[fo. 100 recto, line 10 to line 17].
(6) Astrological epilogue	[fo. 100 verso, line 15, to fo. 101 recto, line 7].
(7) Postscript:—	
(*a*) Phlebotomy	[fo. 101 recto, line 8, to fo. 101 recto, line 33, and fo. 101 verso, line 13, to fo. 101 verso, line 28].
(*b*) Drugs	[fo. 101 recto, line 33, to fo. 101 verso, line 13].
(*c*) Need for "modern" treatise	[fo. 101 verso, line 28, to fo. 102 recto, line 28].
(8) Epilogue:—	
(*a*) Author's motive	[fo. 102 recto, line 29, to fo. 102 verso, line 4].
(*b*) *Explicit*	[fo. 102 verso, line 5 to line 7].

The notes in brackets in the table refer to the text printed in the Appendix. This is a French version written in 1371, and therefore only six years after the composition of the work. The MS. is in the Bibliothèque Nationale at Paris (Français, nouvelles acquisitions, 4,516). It is a beautiful specimen of palæography, and forms one volume with the "Travels of Sir John Mandeville," which precede it in the same handwriting. We may leave open the question whether the French or Latin rendering gives us the original form of the tractate. The use of such words in the Latin version as "guerras" for wars and "rixas" for brawls suggests at least a French-speaking author. The occasional equation of French *comme* with Latin *cum* and many other turns of phrase point, on the other hand, to Latin as the original language of the tractate itself.[1]

The compilatory character of this tractate of John of Burgundy is sufficiently proved by the amount of overlapping and repetition in the subject-matter. Furthermore, even in the 1371 French version there are a number of "items" which interrupt the general narrative. Such "items" may or may not have been in the original form, as issued at Liége by bearded John in 1365, but they vary greatly in the later copies, in which, as in all literature of this type, they tend to accumulate so as to conceal the original basis of the composition.

(1) The *astrological introduction* deals with "remote causes" of the pestilence. In the words of an attractive fifteenth century English translation: "Alle thynges here in erthe as wele thelementes as þinges sprungen and compownyd of thelement(is) ben governed and ledde by tho bodyes that ben above in the Sperys or cercles of the firmament."[2] The atmosphere itself is regarded, according to the Aristotelian doctrine of the elements, as a simple substance, and therefore incorruptible. But the evil influences from on high give rise to corrupt humors or vapours, and these, mingling with the atmosphere, originate epidemics. Nor will the full effect of the evil emanations be at once known, for the "vestigia" will lurk in many places, not in the outer world alone, but also in the humors of the patients themselves.

Our author here attempts a statement of the endemic character of plague in the intervals between the great epidemics:—

> "Not that the aire was corupte in his substance, for hit is a symple þing or an unmedled body, but hit corupteth by encheson of the euyl vapo(u)rs medled togydors. Wherfor epidimia or pestilence in many costes folowith. and yit in many places his traces and steppes apparen as hit shew(i)t(h) wele. for many ane is infect and namely suche as ben replete and stuffed w(i)t(h)

---

[1] This manuscript has been transcribed by Dr. Singer. Miss M. K. Pope, of Somerville College, has very kindly examined the French text, and has come to the conclusion that it is most probably a translation from the Latin.

[2] Sloane, 3,449, fo. 5 verso. The sentence continues: "As Mosehallak seith in his boke of interpretac(i)ons ca(pitul)o de accio, the bodies abouen(n) ben(n) founden(n) to bryng in to alle the bodies þat ben(n) undre their cercles essente or beyng, nature or kynde, substañ(n)ce, vegetac(i)on(n) or thryvyng, lyvyng or deyying as not long sithen(n) of influence or imp(re)ssion(n) of the heuenly or high bodies bothe causatyfly and effectuely the ane was corupte and becom(m) pestilenciall in effect."

humo(r)s that ben mystempled with euyl qualite. But yit coruptyng of the ane is not alone cause of moreyne but also haboundance of humors corupt in hem þat dien. As Galien saith in his boke of ffevers[1] the body suffreth no corupc(i)on, but if the matier of the body be prompt or redy þerto and in a mane(r) subiect or obedient to the coruptible cause ffor right as þe fyre may not brenne but in matere þat is combustible or able to brenne, right so nouther pestilence ne pestilencial aire noyeth not but if it fynde mater redy and obeying to corupc(i)on." [2]

Similarly the nature of the disease caused by corrupt air will in each case depend on the humoral complexion of the patient, and we are warned of the dire results of employing learned masters of medicine excellent on the theoretical side but little expert in practice. "Quomodo curares si causam ignorares," says Hippocrates, followed by Avicenna and "Commentator" (i.e., Averroes).

In most of the MSS.[3] this is emphasized by a reference to a certain "master of Colon,"[4] who had sent to Liége a recipe which might indeed serve to prevent the *spread* of the poison until a proper remedy were available but would be of no use as a *treatment* against the plague.

(2) *Personal Introduction.*—Having shown the exalted combination of learning and experience needed for successful treatment, John modestly proceeds to explain that he therefore has himself written a series of works on the plague, and that this, the latest flower of his wisdom, is especially designed for the plain man, that each may be his own "physicus, curator preservator ac rector."

(3) *Prophylaxis : (a) General Regimen.*—The treatise proper, after setting forth the name and title of its author, opens with instructions how to avoid the plague. A simple, temperate life is recommended. Luxury and, above all, baths are forbidden, lest the pores of the skin

---

[1] Galen, "De Febribus," lib. i, caps. ii to vi (C. G. Kühn, "Galeni Opera," Greek and Latin, vii, p. 273). Cf. Constantinus Africanus, "De Communibus Medico Cognitu locis necessariis," Basel, Henricus Petrus, 1541, lib. v, cap. xi.

[2] Sloane, 3,449, fo. 5 verso.

[3] French: Paris, Bibliothèque Nationale, "Nouvelles acquisitions françaises," MS. 4,516, fo. 97 verso. Latin: British Museum MS., Royal 12 G. IV (VI), fo. 158 recto, column b; Sloane, 134 (VI), fo. 32 recto; Bodleian MS., Ashmole, 1,443 (VI), fo. 352 recto; St. John's College, Oxford, MS. 172 (XI), fo. 259 verso [Latin, practically identical with British Museum MS., Royal 12 G. IV (VI)]; in the Erfurt MS., "Amploniana," Q. 192, fo. 146 recto to fo. 148 verso, the passage is transferred to almost the end of the tract; *see* G. Guttmann "Die Pestschrift des Jean à la Barbe (1370)," "Inaugural-Dissertation zur Doktor Würde," Berlin, 1903. English: British Museum, Sloane, 2,172, fo. 241 verso; Sloane, 3,449 (V), fo. 6 verso; Bodleian MS., Ashmole, 1,443 (IV), fo. 378 verso.

[4] The University of Cologne was not founded until 1388. The "master" was therefore no University official.

be opened and an entry thus afforded to pestilential air. The belief in the importance of the rôle played by the pores of the skin may have reached John of Burgundy through Constantine,[1] while the prohibition against baths in time of pestilence occurs in the brief verse "Regimen Tempore Pestis" in the Salernitan "Flos Medicinae."[2]

(*b*) *Diet.*—We are warned against fruit, except the acid varieties. A light diet is advised. Aromatic wine is good, but we must shun honey and all food cooked with honey. In hot weather a "frigid" dietary must be followed, modified according to the humoral complexion of the individual. The diet must be temperate, and we should drink rather than eat in plague time. White wine is good, and we must partake of much vinegar.

(*c*) *Disinfection.*—Our author turns next to rules for the practice of "disinfection," as we may call it. In cold or misty weather he bids us shut the windows and purify the air within by means of fires of juniper branches, so that the heat and smoke may pervade the room. Or better still, a powder, for which the recipe is given, should be scattered on live coals as a deodorizer, and the resulting smoke inhaled through mouth and nostrils.

The doctrine of miasma implied by this procedure has had as long a history as any in medicine. It may be traced back through Hippocrates to the magic and folk medicine of primitive peoples, and it has come through the Dark and Middle Ages right down to our own time, when old wives still imagine that the sick-room is rendered more healthy by the burning of disinfectant ribbons. The conception probably reached mediaeval Europe through Constantine.[1] The allusions in the classical writings to the use of fire to extinguish plague can hardly have been available to John of Burgundy. Thucydides, however, whose works were unknown in the Middle Ages,[2] is quoted on this subject by Galen,[3] and in one of the anonymous tracts of the great Salernitan Codex at Breslau fires are recommended in houses in damp or marshy positions,[4] while the "Flos Medicinae" contains a specific warning against bad air in the neighbourhood of drains.[5]

---

[1] Cf. Constantinus Africanus, "De Communibus Medico Cognitu locis necessariis," lib. vi, cap. vi.

[2] "Flos Medicinae Scholae Salerni," pt. viii, cap. ix, "Collectio Salernitana ossia Documenti Inediti e Trattati di Medicina, appartenenti alla Scuola Medica Salernitana, raccolti ed illustrati da G. E. T. Henschel, C. Daremberg e S. De Renzi," edited by S. De Renzi, five vols., Naples, 1852-59, v, p. 77:—

"Devita coitum, infirmos, balnea, fructus;
Sit cibus autem tuus bonus, et vinum tibi potus;
Illud sit vinum puro quoque flumine mixtum;
Adde ciboque tuo, cum prandes, semper acetum;
Ex aloe myrrhaque, croco fit pilula firma;
Mane laves vultum dentes manusque per acetum;
Sed caveas oculos ne tangas, nam nocet illis,
Ascatum panem perarctum propter odorem
In manibus serves, sed si fuerint tibi glaucas
Sanguine te minuas, infectum teque noscas.
Sic pestem fugies, hanc formam si bene serves:
Nux, ficus et ruta, muscatum quatuor icta
Legumine sumpta depellunt quaeque venena."

In truth, little was added to this advice until the nineteenth century taught the salutary fear of the rat.

(*d*) *Drugs.*—But disinfection of the air was not enough. The pores of the skin were regarded by most mediaeval writers as the main channel of entry of the pestilential poison. It was therefore necessary to take internal disinfectants to destroy any virulent vapours that had penetrated into the body and were now, perhaps, circulating in the humours. For this purpose aromatic remedies should be taken internally, and a large number of these are suggested.

It is a good thing to carry in the hand a "pomum ambre"—that is, a mass of aromatic drugs made up with resin or amber. All these measures are commonplaces of mediaeval plague literature, and must have proved the source of enormous profits to the apothecaries.

In addition to these aromatic preparations most of the plague tractates, including that of John of Burgundy, recommend a number of homely herbal remedies. Many of the herbs named in the tractates may be found in the recipes of the Salernitan MSS., though it may well be doubted if the plants of the southern Italian region could be identified by the natives of northern and western countries. Doubtless these recipes embody a herbal folklore handed down from remote antiquity. Among the most persistent ingredients are diptaine, scabious, tormentil, pimpernel, roses and violets.[1] Vinegar is also in universal favour both as a potion and a disinfectant.[2]

---

[1] Constantine Africanus, "De Communibus Medico Cognitu locis necessariis," lib. v, cap. x, &c.; cf. also "Flos Medicinae Scholae Salerni," pt. ii, cap. ii, § 46, in De Renzi, loc. cit., v, p. 28.

[2] The first translation of Thucydides into Latin was the work of Laurentius Valla (1407-57) and was not completed until 1452. The *editio princeps* of Thucydides is as late as 1502 (Venice).

[3] Galen, "Ad Pisonem de Theriaca," cap. xvi (Kühn, loc. cit., xiv, p. 282).

[4] "Compendium Salernitanum," "De Adventu Medici ad Aegrotum," De Renzi, loc. cit., ii, p. 79 (and i, p. 202).

[5] "Flos Medicinae Scholae Salerni," pars i, cap. iii, De Renzi, loc. cit., v, p. 2. Cf. also Rhazes, "Liber Divisionum," cap. clviii, "De Febre ex Pestilentia"; Avenzoar, "Theizir," lib. iii, tract 3, cap. i, "De Epidimis qui provenit ex corruptione aeris."

(*e*) *Phlebotomy.*—We are to beware of a flying, pricking sensation in the blood, a warning which recalls those vague symptoms by which the modern vendor of patent medicines seeks to persuade all mankind of its urgent need of his wares.[3] The victim of this terrifying "pricking in the blood" is recommended to have immediate recourse to phlebotomy, to take various medicaments, and to sprinkle the floor of his room two or three times a day with a lotion for which the recipe is given.[4] The details of phlebotomy are discussed in the section on Pathological Theory, and are again taken up in the section on Therapeusis and in the Postscript.

(4) *Pathological Theory.*—If, owing to neglect of regimen, an attack of the plague does indeed supervene, remedies (which, of course, need skilled administration) must be applied forthwith. For the pestilence overcomes the system with disastrous speed and becomes "confirmed" within twenty-four hours.

A pathological explanation of this process follows. The evil vapours having entered the pores are conveyed by the blood to one of the three principal members—the heart, the liver, or the brain. Now it must be known that each of these principal members has an emunctory or place at which it seeks to expel its noxious superfluities. Thus, when the heart is attacked, we may be sure that the poison will fly to the emunctory of the heart, which is in the arm-pit. But if it find no outlet there, it is driven to seek the liver, which again sends it on to its own emunctory at the groin. If thwarted there, the poison will next seek the brain, whence it will be driven either under the ears or to the throat. If still no relief is brought by the blood-letter, the case has indeed become urgent, for the poison, having taken twelve hours to perform its circulation and sought an issue in vain, will now within the next twelve hours indubitably "fasten itself," throwing the patient into an ague and forming an apostume at or near one of the emunctories; and then indeed the evil will be hard to eradicate. The pathological doctrine contained in this section is derived directly from certain Arabian writings.[1]

---

[1] Cf. "Flos Medicinae," De Renzi, loc. cit., v, pp. 30, 31, 32. Neither diptaine nor pimpernel, however, seem to have been known to the Salernitans.

[2] "Flos Medicinae Scholae Salerni," "Regimen Tempore Pestis," *see* note 2, p. 165; Rhazes, "Almansor," tract 1, cap. i, and "Liber Divisionum," cap. clviii; Avenzoar, "Theizir," lib. iii, tract 3, cap. i; Avicenna, "Canon," lib. iv, fin. 1, tract 4, cap. iv; Averroes, "Colligit," lib. vii, cap. xxx.

[3] But cf. Rhazes, "Almansor," tract 1, cap. i, for this phrase.

[4] Cf. Galen, "Methodus Medendi," lib. ix, cap. xiv (Kühn, loc. cit., ix, p. 649); Rhazes, "Almansor," tract 1, cap. i, and "Liber Divisionum," cap. clviii; Avenzoar, "Theizir," lib. iii, tract 3, cap. i; Avicenna, "Canon," lib. iv, fin. 1, tract 4, cap. iv; De Renzi, loc. cit., ii, p. 741.

(5) *Therapeusis*: (*a*) *Phlebotomy*.—The best means of dealing with the situation, however, is by blood-letting. To each principal member and its emunctory there corresponds a superficial vein, the flow of blood from which will ease the part to which it is related. The vein to be opened will therefore depend upon the stage at which the patient passes into the physician's hands. This belief in the relationship of the superficial veins to the different organs of the body has itself given rise to a mass of tracts, many of them illustrated by figures and diagrams, which vary greatly among themselves and show how the teaching concerning blood-letting was in a constant state of flux.

John follows the doctrine that the blood of one side of the body is only in imperfect relation with that of the other side. It is therefore essential to confine our blood-letting activities to the diseased side. If phlebotomy be performed on the wrong side the gravest consequences may ensue, for not only will the patient lose good blood, but its place will be taken by degraded blood from the opposite side, and so the whole system will be corrupted.[2] Other authors take precisely the contrary view and advise blood-letting always from the sound side.

Where the emunctory of the brain appears affected, John recommends scarification with pitch between the shoulders as an alternative to blood-letting. No doubt this treatment rendered doubly desirable the final injunction to administer "comforts" or strengthening compounds for the heart.

(*b*) and (*c*) *Drugs and Diet*.—A short dietary follows, and then more recipes, including that of the infallible powder "pulvis imperialis" or "bethazaar." The word "bethazaar," John explains, is of Arabian origin, and means "a morte liberans." But few apothecaries, we are assured, have the necessary ingredients for this wonderful powder which delivers from death. Its composition, indeed, is unknown to most physicians, but at a certain apothecary in Liège its necessary components may be found. These ingredients prove to be very ordinary herbs, but their names are sufficiently impressive and obscure to have served to disturb the peace of the ordinary layman. The avowed purpose of this passage is to push the wares of a particular apothecary at Liège. Perhaps on that account, although he gives the names of the herbs which enter into this marvellous life-saving preparation, our author refrains from revealing their relative proportions. The dosage of the host of herbal remedies that went to make up a mediaeval prescription was a point to which the greatest importance was attached.

---

[1] Cf. Rhazes, "Almansor," tract 1, cap. i; and Averroes, "Colligit," lib. vii, caps. xxix and xxx.

[2] Cf. "Compendium Magistri Salerni," De Renzi, loc. cit., iii, p. 60.

(6) *Astrological Epilogue.*—A warning is given that the present epidemic of 1365 is to be attributed, not to the recent conjunction of Jove and Saturn, but to the "vestigia" from the conjunction of twenty years ago. Yet the recent meteorological disaster may be relied upon to bring trouble enough: disease on beast as well as on man, war, convulsions of dynasties and among the sects, destruction of many powerful men and of Saracens, famine, storms, and floods.

(7) *Postscript.*—This part of the work covers ground somewhat similar to that already traversed in the previous sections of the MS. It deals, however, with drugs and phlebotomy from a somewhat different angle, and gives a whole new series of motives for the composition of the tractate. The previous section ends with *Amen*, and the Postscript, complete in itself, differs from the remainder of the tractate not only in style but also in the exclusion of astrology and the inclusion of the names of a large number of Greek and Arabian authors. It therefore appears not improbable that the whole section has been lifted bodily from the work of some still earlier author. This conclusion, however, can only be decided by further research.

The list of medical writers contained in the Postscript is an interesting indication of the medical writers known to a Fleming of the fourteenth century. The list consists of Hippocrates, Galen, Dioscorides, Rhazes, Haly Abbas, Rufus, "Damascenus," Hesben (? Geber), Mesue, Copho, Constantine, Serapion, Avicenna, Averroes, and Algazel.[1] He quotes also Aristotle ("philosophus") "de cœlo et mundo." Damascenus is, perhaps, Mesue Senior. The Postscript, after having set forth a regimen of phlebotomy and drugs, passes to the motives of bearded John in writing his tractate. He assures his readers that long experience has convinced him both of the ignorance of the plague and the inefficacy of the remedies of these ancient physicians, and of the relative efficiency of the moderns, and especially of his own remedies.

---

[1] The list varies in different versions. Royal 12 G. IV (VI), fo. 158 recto to fo. 160 recto; Sloane, 2,320 (VI), fo. 13 verso to fo. 16 recto; Sloane, 3,566 (VI), fo. 63 verso to fo. 87 recto, and other versions give, besides Hippocrates, Galen, Dioscorides, Rhazes, Damascenus, Geber, Mesue, Copho, Constantine, Serapion, Avicenna, Algazel, Averroes, *et alii*. The Paris version, Sloane, 134 (VI), fo. 31 recto to fo. 38 verso, and Sloane, 2,322, fo. 93 verso to fo. 99 recto, all add Haly (called "hasp" in Sloane, 134) and Rufus. Other versions have shorter lists.

Explicit.—Thus he has been moved by charity to the composition of the tractate "Non precio sed precibus"—"Not for a price, but for your prayers have I indited this work; and let him whose health returns, pray for me."

The treatise of bearded John attained a wide popularity, especially in this country. There are four Latin and two English copies in the British Museum,[1] and several more in Oxford and Cambridge.[2] In Lille there is, or was, a Latin version.[3] Two copies are known in Germany,[4] one in Brussels, though of a comparatively late date,[5] and Hebrew versions in Paris, Leyden, and Petrograd.[6] The writer has found none in Mazzatinti's great collection of catalogues,[7] so that they must be at least rare in the Italian peninsula, but one of the British Museum copies[8] purports to be the original work of the faculty of

---

[1] Latin: Royal, 12b, IV (VI), fo. 158 recto to fo. 160 recto; Sloane, 134 (VI), fo. 31 recto to fo. 38 recto; Sloane, 2,322, fo. 93 verso to fo. 99 recto; Sloane, 3,124 (XIII), fo. 51 verso to fo. 61 verso. In Sloane 75 (X), fo. 139 recto contains a transcript of a fragment of the Latin treatise. *See* also note 2, p. 171. English: Sloane, 3,449, fo. 5 verso to fo. 12 verso, and Sloane, 2,172, fo. 241 recto to fo. 244 verso (imperfect).

[2] Oxford—Latin: Bodleian MS., Ashmole, 1,443 (VI), pp. 351 to 375; St. John's College, Oxford, 172 (XI), fo. 259 recto to fo. 264 recto; English: Bodleian MS., Ashmole, 1,443 (VII), pp. 376-393. Cambridge—Latin: Trinity College, Cambridge, 1,144 [O.2, 40], fo. 110 verso (fragment). *See* also note 2, p. 171. English: Trinity College, Cambridge, 1,404 [O.8, 29], pt. 1 (II), fo. 25 recto.

[3] Lille, Bibliothèque Municipale, MS. 863, fo. 132 to fo. 140. This MS. is known to the writer only by the catalogue of the library.

[4] Erfurt, "Amploniana," Q.192, fo. 146 recto to fo. 148 verso; *see* G. Guttmann, who prints this text, loc. cit.; Munich: Library of Herr Ludwig Rosenthal MS., fo. 58 verso to fo. 62 recto. *See* Sudhoff, loc. cit., v, p. 59.

[5] Brussels, Bibliothèque Royale, II, 1,413, fo. 114 verso to fo. 116 recto (dated 1421), cited by Sudhoff.

[6] Paris, Bibliothèque Nationale, Nat. Fonds Hébreu, 1,191 (VIII), fo. 141 verso, is unfortunately only a fragment. M. Steinschneider ("Die hebräischen Übersetzungen des Mittelalters," pp. 803 and 804) mentions a Hebrew version of the treatise belonging to Berliner, subsequently acquired by Günzburg, of Petrograd, and also a copy in the Leeuwarden Collection. The latter, in "Leeuwarden MS. 2," has been described by A. Neubauer, in the "Israelitischen Letterbode," Ann. 2, p. 84. This MS. is No. MMDCCLXXVIII (Cod. Heb. 2) in the Catalogue of the University Library of Leyden.

[7] Mazzatinti, "Inventari dei Manoscritti delle Biblioteche d'Italia," Friuli e Firenzi, 1900-15, i to xxiii, in progress.

[8] Sloane, 3,124, fo. 61 recto to fo. 61 verso.

Bologna. Perhaps that University, the ancient and accredited home of astrology, where a chair of the subject had long been established, could hardly afford to admit the authority of a northern barbarian in the local speciality. The French version in the Bibliothèque Nationale is printed in the Appendix.[1] In addition to the Latin copies already mentioned there are in this country four more from which the Astrological Introduction has been omitted. They are otherwise quite complete, and all bear the author's name.[2]

The treatise has been often borrowed without acknowledgment, after the mediaeval fashion. The version of the Bologna faculty has already been mentioned. One of the English versions in the British Museum proclaims itself to be the work of a certain John Stamford, of Syssyon.[3]

Parts of our treatise are skilfully embodied into a Latin "redgement for the pestilence often proved in Oxford and other places," used by "John Stipse usinge surgerye with in the Universytie of Oxforde dwellinge in the paryche of est St. Aldate in fyshe strete at St. Olldys churchestyle in the yere of our lorde 1472."[4] Again we recognize whole passages in a fifteenth century MS. giving advice "ad preseruandum hominem contra pestilenciam, a febre pestilentica,"[5] and in a "trety that is nedefull and necessarie a yinst the pestilens . . . the which trety gadered and sette togidre on englissh a master of diuinite of the ordre of ffrere prechoures Master Thomas Multon of diuerse doct(ir)os of phisik where thei treted of the mater of pestilence."[6]

---

[1] Paris, Bibliothèque Nationale, Nouv. acq. franç., 4,516, fo. 97 recto to fo. 102 verso (formerly 10,602 and Barrois 185). This version once formed a single MS. with the copy of Mandeville's "Travels," now Nouv. acq. franç., 4,515.

[2] They open with the sentence that precedes the prophylactic regimen: "I, John of Burgundy, otherwise called la Barbe, citizen of Liége and professor of the art of medicine, intend, having invoked divine help, to epitomize (enucleare) the preservation and treatment of the epidemic." British Museum: Sloane, 2,320 (VI), fo. 13 verso to fo. 16 verso; Sloane, 3,566 (VI), fo. 630. to fo. 870. Gonville and Caius College, Cambridge: 326/725 [C. M. A. 1,099] (XV), fo. 144b. Trinity College, Cambridge, 1,102 [O.1, 77] (V), fo. 53b. The first three MSS. contain several items in common. Our treatise in each MS. is followed by an English version of the tract "in four parts," by John of Berdeaux, and a copy of the epistle "Dilectissime Frater" considered on pp. 174.

[3] Sloane, 2,172, fo. 241 recto to fo. 244 recto. The end of this MS. is lacking.

[4] Sloane, 3,866 (XIII), fo. 90 recto to fo. 92 recto.

[5] Sloane, 351 (IV), fo. 17 recto to fo. 19 recto.

[6] Sloane, 3,489 (V), fo. 44 recto to fo. 51 recto. This work appears to have been printed, as the following entry is in J. Tanner, "Bibliotheca Britannico-Hibernica," London, 1748, p. 537: "Moulton, Thomas, Frater Ord. Praedicatorum et S. theologiae doctor. Scripsit speculum salutis, continens pestilentiae remedia, planetarum regimen," &c., cap. cxx. Pr. pr. 'I do you wel to wrytte that thys.' Lond. tempore Henr. VIII. . . ." 12mo. Lond. by Eliz. Redman . . . 12mo."

Only one pirate tract cites "the venerable John of Burgundy" by name. This is a late fifteenth century anonymous MS., and follows pretty closely the work of the Liége physician.[1]

(II) THE TRACTATE OF JOHN OF BORDEAUX, 1390.

There is a short treatise usually bearing the name of one "John of Bordeaux, a noble physician," and in many copies dated 1390.[2] It is divided into four chapters, and embodies the work of John of Burgundy, but omits the Astrological Introduction. The first chapter enjoins a moderate regimen, including a careful dietary and complete abstention from the dangerous practice of bathing. The second is concerned with the pathology of the three members and their emunctories. The third emphasizes the need of immediate phlebotomy if the pricking or motion of blood be felt. The patient must fast until the operation of blood-letting has been performed. Should there be an apostume the blood must be let from the side of the body corresponding to the "principal member" affected. Afterwards the heart must be "comforted" with strengthening potions. The fourth chapter provides a brief dietary and recipes.

This treatise follows very closely even the phrases of John of Burgundy, and it is difficult to believe that any other source was used by its author. Its orderly arrangement is, however, in contrast to the rambling style of the longer treatise, and it is therefore probable that a second hand is responsible for the compilation. As the work was immensely popular in England, where the year 1390—the date of many of these MSS.—saw a serious outbreak of pestilence,[1] we may hazard the guess that the compiler of this tractate was a resident in this country. It must remain in doubt whether *John of Bordeaux* was indeed the author's name or whether the designation is a mere version of the name John of Burgundy.

---

[1] Additional, 27,329 (II), fo. 236 verso to fo. 238 verso.

[2] Three copies of the tract, composed of four chapters, purport to be by *John of Burgoyne, professor of Liége*, and bear the earlier date, 1365. These are in identical English, and are probably all copies from an aberrant prototype. They are British Museum Sloane, 965 (VIII), fo. 132 recto to fo. 143 recto; and Bodleian MS. Ashmole, 1,444, pt. i (VI), fo. 67 to fo. 76, add MS. Ashmole, 1,481, pt. ii (I), fo. 52 recto to fo. 53 verso. Another English version of this short tract is described in the Latin title and *explicit* as the work of *Johannis de Barba alius dictus Johannis de Burdegalia*, while it opens with the usual phrase: "Here begynyth a noble tretes made of a good phisician John of Burdeux." It occurs between the Latin version without introduction and "Dilectissime Frater" in Sloane, 2,320, Sloane, 3,566, Trinity College, Cambridge, 1,102 (VI) (O.1, 77), and Gonville and Caius College, Cambridge, MS., 336/725 (C. M. A. 1,099); it is also in the Bodleian MS., Rawlinson, A.429 (XII), fo. 85 verso. Jesus College, Cambridge, MS. 43, Q.D.1, similarly opens: "Here begynnyth a nobyl tretyse made of a physy(cy)on John of bordeus for medycyn ageyn þe pestylens euylle," and ends "Expl. tract. Joh. de burgall editus contra morbum pestilencie qui est morbus epidimialis anno domini mil^{mo} ccc^{mo} nonagesimo." Cambridge University Library, MS. Kk. VI, 33 [2113] (ii), fo. 39 recto, again gives the author as "John of burgoyn or John wiþ þe berd burges of leodye." Additional MS., 14,251, in the British Museum gives the tract on fo. 215 recto and verso under the name "John of Bardendy." Sloane, 2,507, fo. 10 recto to fo. 11 verso, and Harleian 3,383 (II), fo. 9 recto to fo. 11 recto, give the name as "John of Burgon." The name "Bordeaux," on the other hand, appears as "Burdeux," "Bordewy," "Cordewe," &c.

In the British Museum alone there are twenty-two copies of this tract, seventeen being in English, four in Latin, and one in Dutch.[2] In Oxford there are one Latin and five English versions,[3] and in Cambridge one Latin and six English.[4] A copy from the Kelso Abbey Register has been twice printed in modern times.[5] Hebrew versions with some extracts from the longer work of John of Burgundy are known in Paris and Vienna.[6]

[1] Creighton, loc. cit., i, p. 219.

[2] British Museum MSS. of John of Bordeaux.—English: Sloane, 706 (VIII), fo. 105 recto to fo. 107 verso; Sloane, 963 (IX), fo. 55 recto to fo. 57 verso; Sloane, 965 (VIII), fo. 132 recto to fo. 143 verso; Sloane, 983 (II), fo. 37 verso to fo. 39 verso; Sloane, 1,588, fo. 281 recto to fo. 282 verso, a "Praxis Medica"; Sloane, 1,764 (IV), fo. 5 recto to fo. 8 verso (imperfect); Sloane, 2,187, fo. 86 recto to fo. 88 recto; Sloane, 2,320 (VII), fo. 16 recto to fo. 17 verso; Sloane, 2507, fo. 10 recto to fo. 11 verso (part of "Thesaurus Pauperum"; Sloane, 3,566 (VII), fo. 87 verso to fo. 101 recto; Additional, 14,251, fo. 215 recto and verso; Egerton, 1,624, fo. 216 recto to fo. 217 verso (illustrated); Egerton, 2,433, fo. 41 recto to fo. 42 verso; Egerton, 2,572, fo. 67 recto to fo. 69 recto (poem with thumbnail sketch); Cotton, Caligula A.II (XIII), fo. 35 verso to fo. 66 verso; Harleian, 3,383 (II), fo. 9 recto to fo. 11 recto; Lansdowne, 285, fo. 214 recto and verso. Latin: Royal, 13EX, fo. 24 verso to fo. 25 recto ("Scotocronicon"); Sloane, 7 (XX), fo. 85 verso to fo. 87 recto; Sloane, 405 (VII), fo. 41 verso to fo. 43 recto; Sloane, 433 (V), fo. 47 verso to fo. 51 recto. Royal 13EX has been printed by David Murray, "John de Burdeus or John de Burgundia, otherwise Sir John Mandeville, and the Pestilence," Paisley, 1891 (Alexander Gardner). Dutch: Sloane, 68 (IV), fo. 60 recto to fo. 66 verso.

[3] Oxford MSS. of John of Bordeaux.—English: Bodleian Library, Ashmole, 1,444, pt. i (VI), pp. 67 to 76; Ashmole, 1,481, pt. in (I), fo. 21 recto to fo. 23 recto; Ashmole, 1,484, pt. ii (1), fo. 52 recto to fo. 53 verso (imperfect); Rawlinson, A.393 (XVII), fo. 95 recto to 96 recto; Rawlinson, A.429 (XII), fo. 85 verso to fo. 86 verso. Latin: Bodleian Library, Ashmole, 346 (LXXXV), fo. 157 verso to fo. 159 verso.

[4] Cambridge MSS. of John of Bordeaux.—English: University Library MS., Kk. VI, 33 [2,113] (II), fo. 39 recto to fo. 42 recto. Trinity College MS., 905 [R. 14, 32, vac.] (IV), fo. 90 to fo. 92; MS. 1,102 [O.1, 77] (VI), fo. 73 verso; MS. 1,404 [O.8, 29], pt. i, fo. 29 recto; Gonville and Caius College MS., 336/725 [C. M. A. 1,099] (XVI), fo. 148 verso; Jesus College MS., 43 [Q. D. I.] fo. 137 recto. Latin: Corpus Christi College, MS. 171 [F. 9, T. James 62], fo. 393 verso ("Scotocronicon").

[5] Once by W. B. Turnbull: "Fragmenta Scoto Monastica," Edinburgh, 1842, No. 15, p. xcii, and once in "Liber S. Marie de Calchou Registrum Cartarum Abbacie Tironensis de Kelso," Edinburgh, 1846, ii, p. 448. The latter reproduces the MS. abbreviations unopened. The version in Sloane, 2,320, is printed by Sudhoff, loc. cit., v, p. 73.

[6] Paris, Bibliothèque National, Cod. Heb., 1,124, fo. 133 verso to 140 recto, and Vienna, Kon.-Kais. Bibliothek, Cod. Heb., 158.

The tract of John of Bordeaux was often included in other works, as, for instance, in the "Scotocronicon."[1] In some versions and recensions the name of the author is omitted. Illustrations are very rare, but one attractive rendering into English verse is accompanied by a thumbnail sketch to assist the blood-letter.[2] The work is incorporated in an English "approbate treite for the pestilence studied by the gretteste docturs of phisike amonges thunyversite of Cristin nacyons in the time of Sante Thomas of Caunterbury."[3]

The simplicity and definiteness of the directions for phlebotomy in this treatise must have given it a special value for the professional blood-letters, the barber-surgeons, often unlearned men; and it is perhaps for their use that the large number of vernacular versions was prepared. One of these is incorporated in the Guild Book of the Barber-Surgeons of York,[4] and was in use by that body well into the eighteenth century. The volume has an elaborate figure illustrating the instructions for phlebotomy.

(III) THE EPISTLE "DILECTISSIME FRATER," BEFORE 1392.

There exists a further abbreviated version of the tractate of John of Bordeaux. It is anonymous, and is in epistolary form, and opens with a beautiful exhortation: "Beloved Brother, I hear that thou goest in great fear of the plague . . . but surely a little faith would reassure thee, that thou mightest cast off fear and care and sadness and terrifying thoughts and the like, since they are but accidents of the mind and do but offend and consume the spirit. Strive therefore after cheerfulness, for a happy spirit is the very bloom of life, but gloom drieth up the marrow. And next after the counsel of wisdom do thou in all cleanness and sincerity so dispose thy ways that thou mayest live to-day as though thou wert to die to-morrow. Consider thy years from the days of thy youth in all seriousness, extenuating nought, and whatever is evil and debased therein put from thee. By contrition of heart and true confession to God give thyself to better things, since assuredly from a healthy mind comes health of body. Death will have no terror for thee if thy life hath been pleasing to the Most High. And when thy soul is washed clear from sin, thus mayest thou preserve thy body from the pestilential malady."

---

[1] British Museum, Royal, 13EX, fo. 24 verso to fo. 25 recto, called "The Black Book of Paisley," and Corpus Christi College, Cambridge, MS., 171 [F. 9, T. James 62], fo. 393 verso.

[2] British Museum, Egerton, 1,624, fo. 216 recto to fo. 217 recto.

[3] British Museum, Additional, 5,467, fo. 85 recto to fo. 87 recto. This "Sante Thomas" can hardly be Thomas à Becket, who occupied the See from 1162 to 1170. The reference is probably to Thomas Bourchier, Archbishop of Canterbury from 1456 to 1486. The next Archbishop Thomas was Tenison, who was not appointed until 1694.

[4] British Museum, Egerton, 2,572, fo. 67 recto to fo. 69 recto; arranged in three chapters.

This little Epistle is known only in England, where there are at least sixteen copies.[1] Three of these are incorporated in medical MSS. containing remedies for a number of diseases,[2] while two other copies [3] bear the surprising information: "The following letter was made in Oxford in time of pestilence by the masters and doctors of King Henry IV in the 8th year of his reign [i.e., 1406] and was sent by them to the mayor of London, where it was greatly praised by many physicians, apothecaries and others." [4]

A version in which the preliminary exhortation is abbreviated purports to be addressed by Magister Henry Horn, doctor of medicine to Dominus T. Goldston, monk at Canterbury.[5]

---

[1] The above is translated from the Latin of the British Museum MS., Arundel, 334 (XVIII), fo. 49 recto to fo. 53 verso. Other Latin versions will be found in the following: British Museum—Sloane, 135 (XIII), fo. 86 recto to fo. 88 recto; Sloane, 213 (XXIV), fo. 161 recto and verso (omits introductory exhortation); Sloane, 393, fo. 67 verso to fo. 69 verso; Sloane, 2,320 (VIII), fo. 17 recto to fo. 18 verso; Sloane, 3,285, fo. 68 recto to fo. 70 recto; Sloane, 3,866 (VIII), fo. 101 verso to fo. 112 verso; Royal, 17 A.XXXI (IV), fo. 112 verso to fo. 115 recto; Harleian, 3,371, fo. 81 recto to fo. 82 recto. Oxford: Bodleian Library, Ashmole, 393, pt. i (VII), fo. 43 recto (claiming to be the work of Henry Horne, exhortation abbreviated); Digby, 29 (XLIV), fo. 294 verso to fo. 295 recto; Digby, 196 (LXIII), fo. 94 verso to fo. 95 recto. Cambridge: University Library, Ll. I, 18 [2,147] I, fo. 63 verso to fo. 64 verso; Gonville and Caius College, 356/725 [C. M. A. 1,099] (XVII), fo. 151 recto to fo. 152 verso; Trinity College, 1,102 [O.1, 77] (VII), fo. 83 verso to fo. 91 verso; and, finally, Mostyn MS., fo. 221 (mentioned in Fourth Report of Historical MSS. Commission, Appendix, p. 359).

[2] British Museum: Harleian, 3,371, fo. 81 recto to fo. 82 recto (buried in the "Surgery" of John Arderne); Sloane, 393, fo. 67 verso to fo. 69 verso; Royal, 17 A.XXXII (IV), fo. 112 verso to fo. 115 recto.

[3] British Museum: Sloane, 3,285, fo. 68 recto to fo. 70; Cambridge University Library MS., Ll, 18 (2,147), fo. 63 verso to fo. 64 verso.

[4] The text of this Epistle from Sloane 2,320 (VIII) fo. 17 recto to fo. 18 verso, is printed by Sudhoff, loc. cit., v, 77. It is practically identical with Sloane, 3,566 (VIII), fo. 101 verso to fo. 112 verso.

[5] Oxford: Bodleian Library, Ashmole, 393, I (VII), fo. 43 recto. T. Tanner, "Bibliotheca Britannico-Hibernica," Lond., 1748, p. 413, mentions a work, "Contra Pestilentiam," presumably our Epistle, addressed by Henry Horn to Tho. Goldston, *Prior* of Canterbury. Tanner found a copy among the John Twyne MSS. of Corpus Christi College, Cambridge.

(IV) THE LOST TRACTATES OF JOHN OF BURGUNDY, BEFORE 1365.

Before leaving the series of plague tracts associated with the names of John of Burgundy and John of Bordeaux, we must refer to a bibliographical puzzle in the work of the former. At the beginning of what we have called the "Personal Introduction" to his tractate he writes as follows: "I, John of Burgundy, otherwise called à la Barbe, citizen of Liége, and professor in the art of medicine, yet nevertheless the least of all physicians, in time past at the commencement of this pestilence made a treatise of the cause and nature of its corruption and it began *Deus deorum dominus qui simpliciter et absolute omnium entium prima est causa.* Item I made another treatise on the distinction of pestilential from other maladies which commences, *Cum nimium propter instans tempus epidimiale, etc.* And there are many who have copies of these."[1]

A careful examination of 187 astrological MSS. selected as among the more promising in the British Museum has so far failed to reveal a treatise exactly corresponding to John of Burgundy's description. As copies of this work were in the possession of many of his contemporaries it is unlikely that it is altogether lost. There is, indeed, an astrological work beginning "*Gloriosus Deus et sublimus creator omnium rerum in prima mundi origine ordinauit in* 7 *speris* 7 *planetas.*" Several versions of this work, including an English translation, may be found in the British Museum.[2] They deal with the heavenly bodies and their qualities, including their humoral influences, and they may possibly represent the missing treatise of John of Burgundy.

The second work which he claims begins with the words *Cum nimium propter instans tempus epidimiale.* These words at once recall the opening of the *Epistle:* "Dilectissime Frater, *ut intellexi multum times pro instante epidemia.*" But how are we to identify that work with John of Burgundy's lost tractate in view of his assurance that the subject of the latter is *de distinctione morborum pestilentialium ab aliis?*

---

[1] Paris, Bibliothèque Nationale, Nouv. acq. franç., 3,516, fo. 98 recto, lines 2 to 12 (*see* Appendix); Sloane, 134 (VI), fo. 32 recto, and Sloane, 2,322, fo. 94 recto. Other MSS. give only the words "Deus deorum" as the *incipit* of the first tractate.

[2] Latin: Royal, 12 B. 25, fo. 254 recto; Harleian, 3,814, pars 1, fo. 91 recto to fo. 95 verso; and Sloane, 636, fo. 71 recto to fo. 73 recto. These all date from the fifteenth century. The English version in the British Museum (Royal, 17c, XV, fo. 10 verso to fo. 15 verso) is incorporated in a sixteenth century MS. A beautiful fourteenth century Latin MS. of the work is at Oxford in the Bodleian Library, where it occupies fo. 119 recto to fo. 120 verso of Digby MS. 147 (XXVII). The versions present considerable variations. In both Sloane 636 (fo. 73 to fo. 74 verso) and Digby 147 (fo. 120 verso to fo. 124 verso) our tract is followed by "De 28 Mansionibus Lune."

The Epistle, as we have seen, deals with no such topic. It can only be suggested that the author, who appears to have deliberately set us these puzzles, has certainly much in common with that arch-practical joker, the author of Sir John Mandeville's "Travels."

(V) Other Medical Works attributed to John of Burgundy, John à la Barbe, John of Bordeaux, or Sir John Mandeville.

A few other medical MSS. bear the names of these authors. Thus at Heidelberg there is a document in which mention is made of "Pulvers in Das Grosse Kunst Buch von Barba,"[1] while both the Heidelberg and the Bodleian libraries have a number of medicinal recipes attributed to Sir John Mandeville himself.[2] Again, the name of John of Bordeaux is borne on a MS.[3] identical with the so-called "Gouernayle of Helthe." The same Regimen Sanitatis appears in many MSS. as the "letter from Aristotle to Alexander the Great, De sanitatis tuenda."[4] This "letter" was translated by Ibn Daud, also called John Hispalensis, or John of Toledo (floruit 1135-53).[5] He took it out of the shorter or western version of the "Secretum Secretorum," a work that also circulated under the name of an epistle from Aristotle to Alexander the Great.[6] "The Gouernayle of Helthe" was published in London in 1496 by Caxton, and again by Wynkyn de Worde. Our Liége physician is here again curiously connected with a landmark in English literature, for this little volume is said by Blades to be the first on a medical subject to have been published in England. Probably the attribution of "The Gouernayle of Helthe" to John of Bordeaux is simply due to a confusion of the work with the Latin translation of Galen's "De Regimine Sanitatis," by Giovanni de Borgondio (of Pisa, died 1190).[1]

---

[1] Heidelberg University Catalogue, Pal. Germ. 228, fo. 1 to fo. 18.

[2] Heidelberg University Catalogue: Altdeutsch, 41 (Pal. Germ. 66); Altdeutsch, 80 (Pal. Germ. 138) Altdeutsch, 238 (Pal. Germ. 806). Oxford: Bodleian MSS., Ashmole, 1,441, fo. 25 to fo. 28; Ashmole, 1,479, fo. 320; Ashmole, 1,407, fo. 11 recto to fo. 51 verso.

[3] Sloane, 989.

[4] Among these are—British Museum: Sloane, 59; Sloane, 405, fo. 23 verso; Sloane, 420; Sloane, 783B; Sloane, 2,320, fo. 10 verso; Sloane, 3566, fo. 38; Burney, 350, fo. 360; Burney, 360; Arundel, 123; Arundel, 185; Arundel, 459. Oxford: Bodleian MS., Digby, 228; Exeter College MS., 35 X. Cambridge: Gonville and Caius College, 336/725 (C. M. A., 1,099). The printed versions of this work bear no author's name. *See* "The Gouernayle of Helthe with a medecyne of ye Stomacke," reprinted from Caxton's edition (circa 1496), with introductory remarks and notes by William Blades, Lond., 1858.

M. Steinschneider, "Die hebräischen Übersetzungen des Mittelalters," Berl., 1893, p. 981.

[6] This information was kindly given me by Mr. R. R. Steele.

A medical MS.[2] dating from the sixteenth century contains an English work entitled "Thesaurus Pauperum." The *incipit* runs thus: "Here begins the noble booke of physicke and of Surgery thesaurus pauperum . . . made by a noble phisicion callyde John of Burgon or otherwyse callyd la barbe in the yr of our Lord 1327." This work includes an English version of the plague tractate in four parts of John of Bordeaux, here again called John of Burgon.

(VI) THE "COMPENDIUM DE EPYDIMIA" OF 1348.

One plague treatise has come down to us, probably dating from the very year 1348. This is the "Compendium de Epydimia" of the Paris Faculty of the Colleges of Medicine, written by command of King Philip VI (1328-50). The elaborate classification of this work into divisions and subdivisions recalls the Arabian writers. It may be thus summarized:—

- *Summa I: Causes.*
    - Cap. i: Primary causes.
    - Cap. ii: Secondary causes.
    - Cap. iii: Prognostics and signs attached to each.
- *Summa II: Preservation and Cure.*
    - Tract 1: Prophylaxis "per dietam" (i.e., by regimen).
        - Cap. i: Rectification of the air.
        - Cap. ii: Exercise and baths.
        - Cap. iii: Food and drink.
        - Cap. iv: Sleep, vigil; inanition and repletion; accidents of the mind.
    - Tract 2: Treatment "per medicinalia" (i.e., by doctor's remedies).
        - Cap. i: Universal remedies. (Chiefly phlebotomy. When there are apostemata the rules for the blood-letter correspond pretty much to those in the treatises already examined.)
        - Cap. ii: Particular and appropriate remedies.
        - Cap. iii: Antidotes.
          (Both Caps. ii and iii deal with drugs and diet.)

---

[1] In the Cambridge University Library there is an MS. volume of the late fifteenth century in which "The Gouernayle," here called "Liber de Bon Gouernance," is immediately preceded by the epistle "Dilectissime Frater" (Cambridge University Library, MS., L, 1, I, 18 (I) and (II).

[2] Sloane, 2,507, fo. 10 recto to fo. 11 verso. The "Thesaurus Pauperum" occupies fo. 7 recto to fo. 20 verso.

The regimen prescribed is not unlike that of John of Burgundy, but phlebotomy is subordinated to *disinfection*. The plague is attributed to astrological influences dating back to the year 1345.

The British Museum version of this treatise[1] is probably an exact copy of the work. It bears the date 1373, and purports to have been sent in that year "from the flourishing school of Paris" to Milan during an outbreak of the plague.

(VII) THE TREATISE OF JOHANNES JACOBUS, ABOUT 1364.

Somewhat similar in outlook, but less verbose than the work of John of Burgundy is that of his contemporary Johannes Jacobus, Royal and Papal Physician, Chancellor of Montpellier and friend of Guy de Chauliac. This treatise opens with a dedication to authority human and divine, and consists of three chapters dealing respectively with the cause of the pestilence, the regimen against it, and treatment for it.[2]

The *causes* of the pestilence are divided into three categories—those from beneath, those from above, and a combination of the two.

The terrestrial causes may be of a special nature [*particulares*] such as bad sanitation in the house. This constantly gives rise to pestilential fever, "and many physicians are deceived; and not recognising the disease, they are ill able to cure it." Or a universal plague may result from a widespread [*generalis*] terrestrial cause, as from corpses after war or from foul standing water. This has happened in his own time in Sardinia and other "corrupted" regions. But sometimes the pestilence will come from the air on high. We may detect nothing unusual, but the "celestial humors and spirits" are corrupted. Sometimes those who live in a usually healthy atmosphere will suffer more from this pestilence than those who habitually live in bad air, such as prisoners, or inhabitants of places close to stagnant waters. As has been remarked by Isaac in his work "De Retardanda Senectute," a plague among animals will not pass to human beings, nor will the reverse occur. Thus we may see men dying while animals are immune, or the mortality may be among cattle and other animals, and sometimes among birds or among swine. But the best prophylactic against the plague is to flee, and far must be our flight.

---

[1] The British Museum copy occupies Harleian, 3,050 (XVII), fo. 66 recto (b) to fo. 68 verso (b). Unfortunately, the *explicit* is partly blurred. L. A. J. Michon, "Documents inédits sur la grande Peste de 1348, thèse pour le Doctorat en Médicine," Par., 1860, prints an imperfect seventeenth century version from Paris, Bibliothèque Nationale, Anc. fonds Latin, 7,026, which, he says, is based on two earlier versions; one in the Fonds St. Victor and one in the library of Dr. Moreau. From the seventeenth century version we obtain the date 1348, which also corresponds to the reign of King Philip. The MS. from the St. Victor Library is now 7,082 in the Bibliothèque Nationale. J. F. C. Hecker has collated it with MS. 7,026, so as to restore the complete text, which he publishes in *Wiss. Annal. der Gesammten Heilkunde*, Leipz., 1834, xxix, p. 219.

[2] Besides the plague treatise, Johannes Jacobus wrote a "Thesaurum Medicinae" and a work on the stone. *See* P. Pansier, "Les maîtres de la faculté de médecine de Montpellier au moyen-âge," *Janus*, 1904, p. 600; and E. Wickersheimer, "Johannes Jacobis Steintraktat (Ende des 14 Jahrhunderts)," in *Archiv f. Gesch. d. Med.*, Leipz., 1910, iii, p. 41.

The disease may manifest itself either as a fever or an apostume, or either symptom may be followed by the other. Should there be an apostume it will appear at the emunctories of the three principal members, for the venomous matter attacks them chiefly. Nevertheless, Nature may be in many ways disturbed and yet the lesion not be apparent. Uroscopy will be of no help, and many physicians fail to observe when the patient is drifting deathward, but still continue their chatter about turning the qualities towards the marrow.

Johannes Jacobus now turns to the signs of the disease, but in spite of his severe remarks on diagnosis under the heading "Causes," he merely observes that the signs may be deduced from the causes of the disease and also from the signs of other fevers. "Therefore I will not trouble to blacken paper on this subject."

Two questions are now considered. First, why are only some people attacked by the scourge while others escape? The answer is: Some people are exposed more directly to the evil influence and others present a greater predisposition on account of their humoral complexion, or because their pores are open; such are especially those misguided wretches who are too prone to yield to the temptation either of baths or of wrath.[1]

The second question is: "Are these pestilential diseases infectious? This is answered in the affirmative, for "these bodies emit poisonous exhalations that corrupt the air." Thus the conception of infected vapours and infected humors inevitably developed into the idea of infection from one individual to another.

It is characteristic of all this literature that there is seldom any question of public measures against the plague—the whole attention of the writer is fixed on the individual avoidance of the disease. So in the present treatise we are advised to flee from those infected by the plague and to avoid crowds. The physician and the "assistant to the seke" are both warned to stand far from the patient, facing door or window.[1] Also the air in the patient's room should be frequently changed, the north and east windows being opened, but those to the south kept fast shut.

---

[1] Cf. Constantine Africanus, "De Communibus Medico Cognitu locis necessariis," v, p. 1, ed. Basel, 1546, and De Renzi, loc. cit., ii, pp. 17, 124; iv, p. 587.

In the *second* chapter of his treatise Johannes Jacobus advises the careful choice of a house, where there is a suitable middle floor. The lower chamber must not be used, since it is subject to rheums; but should this not be the case, it would be even better than the middle floor. But the upper chamber must in no case be inhabited, as it is subject to celestial influences. In stormy or misty weather we should stay at home. Our author deprecates visits to the town in time of pestilence, advising rather that we should busy ourselves within doors away from crowds. The house is to be sprinkled with rose-water, vinegar and other decoctions, and this is especially important in summer. In all seasons we are advised frequently to wash hands and face in rose-water and vinegar, and to smell this fragrant mixture. But our author expresses his distrust of the custom of carrying a "pomum ambre" in the hand, unless it be mixed with camphor and sandal, as otherwise it will attract corrupt air to the heart.[2] Johannes Jacobus also advocates fires, since they greatly impede the passage of evil emanations from above, and they "purify the air even as a lodestone [*lapis magnes*] if painted with garlic will no longer attract iron." [3] This idea that garlic is antagonistic to the action of the magnet is an ancient sailors' superstition. It was refuted by Giambattista Porta in the sixteenth century, and scorn was poured upon it by the great investigator William Gilbert.[4]

The *personal regimen* of Jean Jacques is much like that of John of Burgundy. A similar dietary is provided and gentle exercise advised "in some place where neither the sun nor the rays of the moon penetrate." Sleep in the day-time is deprecated, and in all circumstances we should sleep only at a long interval after meals, with the head raised, girdle and shoes removed, and with every precaution against cold. Baths must, of course, be avoided except *in extremitatibus*, and on no account must we experience either wrath or too great joy. Phlebotomy is recommended once a month, unless contra-indicated, as by age, pregnancy, great weakness or flux. It should be performed on the basilic unless there be local [*in parte*] pain, in which case the rules given below will be followed. The preservative regimen concludes with some recipes.

---

[1] This passage is omitted in Sloane, 404 (III), *see* note 5, p. 181.

[2] In Sloane, 3,124 (XVI), on the other hand, this custom is recommended.

[3] This simile is omitted in 3,124 (XVI).

[4] The superstition of the effect of garlic on the magnet is discussed by the late Professor Sylvanus P. Thompson in his "Notes on the 'De Magnete' of Dr. William Gilbert," London, 1901, pp. 4 and 5.

The third section of the tractate of Johannes Jacobus concerns *treatment*. In cases where there is fever without abscess formation, the action of the bowels must be promoted by suppository and clyster. This may be followed by mild phlebotomy, but the patient's strength must not be exhausted. Diet should be as in acute fever, and the heart should be well supported by a cordial electuary. Should the fever be accompanied by apostemata, phlebotomy should be performed. The rules, based on the pathology of the three principal members and their emunctories, are carefully set forth. The instructions depend on the development at the various sites of "dolor vel apostema." Johannes Jacobus expresses his agreement with Arnald de Villanova that tyriaca (theriac) should not be laid on the apostemata, as it drives the poison inward. The physician should always seek to "comfort" the heart, but if an apostume form in that most vital organ, theriac must then be given. This therapeutic marvel, theriaca, inherited from classical antiquity, was thus reserved for extreme peril. The cautery is deprecated by Johannes Jacobus on account of the pain involved, but recipes are given for plasters. The treatment of a broken apostume, he adds, should be entrusted to a surgeon. In conclusion, he exhorts the reader: "If I have said ought ill, let it be suppressed with gentleness and if ought good let it be received with joy." [1]

There are in the British Museum three MSS. of this treatise of Johannes Jacobus. All are in Latin.[2] There is a well-known story of Guy de Chauliac that in spite of all entreaties he refused to leave Montpellier during the terrible plague outbreaks of 1348 and 1360. The tale is appended to one of the Museum copies of the tract of Johannes Jacobus.[3]

---

[1] "Et si aliqua dicta sunt minus bene cum humilitate reprimantur et bene dicta cum gaudio recipiantur," in British Museum Additional, 4,897 (I), not in the other two British Museum MSS.

[2] Additional, 4,897 (I), fo. 1 recto to fo. 8 verso. Sloane, 3,124 (XIV), fo. 61 recto to fo. 66 recto (imperfect); Sloane, 3,124 (XVI), fo. 66 verso to fo. 70 recto (imperfect). Sloane, 3,124 (XVI), follows Jacobus fairly closely, though some of the recipes are different. The work was apparently pirated, but the name in which it appeared has been obliterated by the copyist, who perhaps gradually recognized the treatise that he had already written out on fo. 61 recto to fo. 66 recto. The word "foligno" may just be deciphered in the erased portion. The same volume contains the treatise of John of Burgundy, pirated by the Bolognese doctors. The whole volume was probably written in Italy.

[3] Additional, 4,897 (II), fo. 9 recto to fo. 10 recto.

(VIII) THE TREATISE OF BENGT KNUTSSON, MIDDLE OF THE FIFTEENTH CENTURY.

A hundred years after Johannes Jacobus, his treatise was adopted wholesale by Bengt Knutsson, Bishop of Våstorås, near Stockholm. Bengt lived in stormy times. From his designation in this treatise as Bishop "Arrhusiensis in the kingdom of *Dacia*," we may gather that his own leanings were to the *Danish* dynasty rather than to the rival Swedish claimant to his country's throne. He did not receive his bishopric until 1461, the year before his death, and we may imagine that he supported himself by medicine when ecclesiastical preferment through royal patronage seemed unattainable.

Bengt introduces into the treatise further meteorological lore, but on the other hand he develops yet further the practice of disinfection. He arranges the work carefully in five chapters, dealing respectively with the tokens, the causes and the remedies for pestilence, the comforts for the heart and principal members, and the rules and seasons for blood-letting. The "seven tokens" of pestilence are all meteorological, save the third, a plague of flies. The fifth token is a blazing star, and this portends not only pestilence but also great slaughter in battle. In the third chapter our Bishop appropriately enjoins repentance, the prime remedy, "as says Jeremye the prophete," but though this is the best measure of all he proceeds to detail various methods of disinfection. He holds emphatic views on sanitation, and he assures us "yt ys holsume that the housse be keppet cleen." He gives a special warning against the influence of the south wind.[1] Further we are exhorted to "Beware of any multitude of people leste that be the breth off summe of them may be enffecte," and "Let them beware of bathes for allytyl ferment do corrupte halle the body."[2]

Bengt tells us that "In the mounte Pessulano (Montpellier) y coude not avoyde the communate, for y went frome place to place be cause of my pouertė; wher y toke a sponge or ellys brede put in vinegre and bared w^{t} me, puttyng to my nose and to my mouth[3]; for why, halle maner of shyarpe lycours as vinegre and suche others they stoppe the weys of the humors and cause that venemouse thynges shalle not entre. And be this maner meanys y schaped from pestilence where myne done falloshype hadde no bellew but y shulde dye. And halle thys remedies y proued be myselff."[1]

---

[1] Sloane, 404, fo. 286 verso. The fear of the south wind is referred by Bengt to Hipp., Aph. III, where it may be found in the fifth chapter.

[2] Sloane, 404 (III), fo. 287. In other versions "a little ferment" becomes "a little thing."

[3] Cf. Rhazes, "Liber Divisionum," cap. 158, and "De Aegritudinum Curatione," De Renzi, loc. cit., ii, 87.

Our bishop concludes his chapter on "Comforts of the Heart and pryncipall Members" with the invaluable advice: "To be mery in the herte is a great remedie for helth of the body. Caste halle . . . fantasyes and eat and drink mesurably. Therefor in time of this grete infirmite beware ye fear not deth. But lyve merily and hope to lyve long."

The rules as to treatment by phlebotomy are more elaborate than in the treatise of Johannes Jacobus. They are preceded by some pretty advice as to regimen. The desire for sleep after meat must in time of pestilence be sternly repressed.[2] Rather we should go out and walk first in the gardens or fields. The onset of the plague may be recognized by loss of appetite, desire for sleep after dinner, "grete hete under cold," and pain in the head. But all may be "putte away" by moving of a space hither and thither. "To ride or to walk he may not for sleuthe of the body and the wryght of the same." If, however, these symptoms are not recognized, the botches will appear by midday[3] and bleeding should be prolonged until the patient swoons.[4] The site for this drastic proceeding is based on the pathology of the three members, as with Johannes Jacobus.

There are in the Museum two Latin and three English versions of Bengt's treatise.[5] It became very popular, and it was several times printed both in Latin[6] and in English versions. Two English editions are ascribed to Machlin, London, 1480, and each is represented by only one copy, respectively in the British Museum and in the John Rylands

---

[1] Sloane, 404, fo. 287 verso. Sudhoff has found this passage, as well as the chapter on "Tokens," in a MS. bearing the name of Johannes Jacobus; cf. Sudhoff, loc. cit., v, p. 56.

[2] De Renzi, loc. cit., iv, p. 587; v, p. 1.

[3] Sloane, 404, has "half a day."

[4] Sloane, 404, inserts a merciful "almost."

[5] Latin: Additional, 30,935 (XVIII), fo. 326 recto to fo. 329 recto, and Egerton 2,622 (VI), fo. 74 recto to fo. 80 recto. English: Sloane, 404 (III), fo. 282 recto to fo. 293 verso; Sloane, 1,588, fo. 275 verso to fo. 280 verso (where it precedes the English tract in four chapters by John of Bordeaux in a "Praxis Medica"), and Sloane, 2,276 (II), fo. 191 recto to fo. 199 recto.

[6] Two Latin editions are both ascribed by the British Museum Catalogue to G. Leeu, Antwerp, 1485, and a third to Arnaldus de Colonia, Leipzig, 1495 (all with queries).

Library at Manchester. The Rylands copy has recently been reproduced in facsimile.[1]

(IX) SOME ANONYMOUS TRACTATES OF THE FOURTEENTH CENTURY.

(1) A short anonymous tract[2] dating from the fourteenth century gives much the same views as those of Johannes Jacobus regarding the causes of pestilence. Meteorological portents are added to the list of "causes," and these perhaps suggested the excursions in Bengt's treatise in the succeeding century. Symptoms are here also described and are referred to humoral action. The tract ends with the remark that after the signs of pestilence follows the cure, and passes immediately to the complete treatise of John of Burgundy.

(2) A small tractate of the fourteenth century[3] contains a discussion as to the nature of contagious diseases. They are defined as "diseases which are wont to invade the healthy by mere contact or conversation or such trivial cause." Chief among these diseases are the various fevers. The cause lies in corrupted air if infection is conveyed by the breath. Among the contagious diseases are ophthalmia [*lippitudo*], "lepra," all forms of pleurisy, and often phthisis, peticia (typhus ?), "scabies" (often conveyed by the sweat), and erysipelas. The evil is best avoided by shunning those who are infected, including even friends and wards [*custos*], by taking good wine and "panis piperatus," by electuaries, and by pure sweet smells. The doctor who has felt the pulse of a patient suffering from these diseases should immediately immerse his hands in vinegar and water, and beware lest the noxious fumes enter with sweat through his open pores.

---

[1] Guthrie Vine, "A Litil Boke . . . for . . . the . . . Pestilence." John Rylands Facsimile 3, Manchester, 1911. Besides the two Machlin editions of 1480, another English edition is attributed to the same publisher about the year 1483, and survives only in a single sheet in the Cambridge University Library. The same library has also an English edition published by Wynkyn de Worde about 1510, and a fragment which appears to represent a reprint of Machlin's 1483 edition by Jan van Doesbosch, Antwerp, early in the sixteenth century.

[2] British Museum, Royal 12, G. IV (VII), fo. 157 verso to fo. 158 recto.

[3] Sloane, 568 (XXIII), fo. 217 verso to fo. 218 recto.

(X) THE "MISSUM IMPERATORI," 1371.

There is in the British Museum a MS. in a fifteenth century hand containing a copy of a short tract[1] compiled in Bohemia in the fourteenth century in time of pestilence. Copies of this little work abound in Central Europe, where it is often described as "*missum domino imperatori,*" and usually bears the date 1371.[2]

The British Museum Latin MS. version follows immediately after a copy of Bengt's treatise in a volume which once belonged to a Carthusian monastery at Erfurt. The tract is arranged in eight short paragraphs, which are numbered in many copies. It is devoted entirely to prophylactic measures, and makes no mention of astrology. Emphasis is laid on phlebotomy, and most of the points raised by Johannes Jacobus of Montpellier receive brief notice. We meet again the wise counsel of the author of the epistle "Dilectissime Frater," that in time of pestilence we do keep a cheery countenance. The seventh paragraph runs as follows: "Item: If you are told about the plague, consider the matter unheard."

A German version of this little tract written in the fifteenth century appears in Arundel 164, and this time is described as sent "by our father the pope to Kayser Karl in the year 1371." It is a little longer than the Latin version, but does not include the useful item above quoted.[3] Similar to this German version is the Dutch letter "sent by the chief physician of the supreme kayser to the lady van Pleu."[4]

---

[1] Additional, 30,935 (XIX), fo. 329 recto to 331 verso. Charles IV was crowned Emperor in 1355, and occupied the Imperial throne until his death in 1378.

[2] *See* Sudhoff, loc. cit., iii, p. 149, and iv, pp. 191, 195, 389, &c.

[3] Arundel, 163 (VII), fo. 115 recto and verso. Printed by Sudhoff, loc. cit., iv, p. 199. Gregory VI was Pope from 1370 to 1378. His predecessor, Urban V (1367-70), was strongly supported by the Emperor, Charles IV.

[4] Additional, 4,897 (IV), fo. 13 recto to fo. 14 verso. This little MS. is printed by Sudhoff in "Studien zur Geschichte der Medizin," H. 8, pp. 192-199, and is further discussed by him in the *Archiv*, loc. cit., iv, p. 203.

(XI) THE TRACTATE OF PIETRO DE TOSSIGNANO, 1398.

We next consider Pietro de Tossignano's plague tractate, written in 1398.[1] Pietro studied medicine and surgery in Padua, and in 1377 he bought lands and settled at Bologna near his native Tossignano Castillo, by Imola. In 1386, the Council of 400 bestowed the citizenship of Bologna on Pietro and his descendents, and allocated to him a considerable salary as "Prelector" of Medicine on condition of his promise to devote the remainder of his life to the University. Pietro accepted the condition, but soon after succumbed to an invitation from Francesco Di Carrara, who offered him large sums to "read" medicine in Padua. So in 1390 the irate Council of Bologna not only deprived Pietro and his children of their civic rights, but confiscated all their property in the city. By 1396 Pietro was anxious to return to Bologna. Powerful friends interceded for him with the gonfaloniere, and he was received back and his honours and possessions restored. He probably lived to enjoy his position for another seven years.

Tossignano's plague tract is divided into four chapters, of which the first deals with causes of the disease, the second sets forth a detailed preventive regimen, the third enunciates and replies to eleven queries or difficulties, while the fourth provides a curative regimen. His explanation of the causes of the plague is on much the same lines as those of John of Burgundy and of Johannes Jacobus, but he has a more definite notion of contagion. Among the causes of the disease he mentions "contact,"[2] while in the second chapter, after describing the signs of pestilential air, he advises instant departure from localities where such signs are seen, explaining that it is safer to move to a region where there has never been an epidemic than where pestilence has reigned even six months back, since the "reliquiae"[3] will remain and, acting like a ferment, will infect those who come into the locality.[1] Again, in answering one of his numerous "queries," Tossignano speaks of "contagious houses,"[2] while in the fourth chapter, after pointing out that apostemata really concern the surgeon, he gives advice as to their treatment, and warns the surgeon to exercise extreme caution when the apostemata have broken, using vinegar, &c., and above all not touching the botches, since the discharge holds a subtle and virulent sanguineous and highly contagious poison.[3]

---

[1] The British Museum MS. of this work, Additional, 30,050 (II), dates from the fifteenth century. In it Tossignano's tract has become divided, and occupies fo. 110 recto to fo. 115 verso, and fo. 85 verso to fo. 91 verso of the volume. Tossignano's "De Peste" was printed in Ketham's "Fasciculus Medicini," Venice, 1493, and numerous later editions. In these volumes it is preceded by an interesting picture of a plague patient receiving physician and attendants. The physician is feeling the pulse, and some of the disinfectant measures recommended in these pest tractates may here be observed in application. Among the best known of Tossignano's other works are: "De Medicamentis Formulis," Venice, 1518; "De Balneis," Venice, 1533, and Leyden, 1587; "Regimen Sanitatis," Paris; "Tabula in Probl. Arist.," Paris; "Recipes in 9 Almansor," Venice, 1517.

[2] Fo. 110 verso to fo. 111 recto.

[3] Cf. John of Burgundy's "vestigia," which, however, appear to be regarded more definitely as astrological phenomena.

Pietro does not fail to give due weight to astrology. Indeed, he explains that apparently terrestrial causes of the pestilence are indirectly due to celestial emanations.[4] At the same time he ascribes endemic pestilence to climatic conditions, explaining thus the prevalence of the disease in Upper Lombardy, or in "such damp places" as Naples and Ferrara.[5] Into the ætiology he enters in greater detail than any writer so far considered. The pathology of the three principal members explains in his view only one form of the disease; the onset may also occur through the "suffocation of natural heat by moisture" as in catarrhs, or through the generation of worms by evil humors. His regimen for the cure of the disease is divided into measures for keeping up the patient's strength and for dealing with fever and with apostema.[6] Under the first category are "comforts" for the three principal members, "and also for other members, such as the stomach," together with elaborate "rectification of the air." Fever is to be treated by "desiccation and evacuation," phlebotomy being the form of evacuation chosen only "where sanguineous humor preponderates."[7] Less detail is, however, devoted to treatment than to the causes of the disease and to the preventive regimen. The latter is especially elaborate. It comprises all possible measures for rectification of the air, including the use of greenery in the sick chamber.[1] The personal régime in plague time is considered in the greatest detail. Periodical bloodletting is advocated where circumstances are favourable. All luxury is forbidden, while sleep must be taken only in moderation and not either in day time or after meals. All the usual precautions are, indeed, here advocated, and into every point Tossignano enters at some length. He, of course, gives recipes, and discusses the ingredients with minute care.

---

[1] Fo. 113 recto. In the printed version the "6 months" are omitted, but it is explained in greater detail that, just as ferment surrounded by flour will dispose the flour to fermentation, so the air infected by pestilence (pestilentiatus) will influence the body.

[2] Cap. 3, Questio 3, fo. 85 verso, refers to the seasonal incidence of plague. Tossignano explains (point 3) that infection is carried by winds and that pestilence is seldom the result of the air from contagious houses being set free by special local causes. This part of his argument is omitted in the printed versions.

[3] Fo. 99 verso.

[4] Cap. 3, Questio 1, fo. 117 verso.

[5] Cap. 1, fo. 112 recto. These examples are omitted in the printed work.

[6] Cap. 2, fo. 112 verso.

[7] Cap. 4, fo. 87 verso. Cap. 2, fo. 112 verso to fo. 117 recto.

(XII) THE TRACTATE OF BLASCUS OF BARCELONA, 1406.

This tractate[2] was composed by Blascus, Physician to the King of Aragon, in 1406. Martin the Humane, King of Aragon (1396-1410), was a patron of learning, and took steps for the formation of a medical *studium generale* at Barcelona.[3] We have not been able to identify the physician Blascus, though he may be the Portuguese Valescus de Tarenta, who flourished between 1380 and 1418. Our tractate is, however, quite different to Tarenta's published work on the plague. Or possibly the author of this MS. may be Biagio (Blaise, Blascus), of Perugia, who was lecturer in medical theory at Bologna in 1396.[4] We do not hear of Biagio migrating to Barcelona, but King Martin was in relationship with the learned faculties of Bologna.[5]

The pest was almost endemic in Spain throughout the fifteenth century, but the most serious outbreak in Barcelona was in 1408,[6] two years after the treatise of Blascus was written. In this treatise Blascus shows much of the same influences as John of Burgundy. He sets forth the virtue of spreading knowledge, and explains that the ancients did not live in time of pestilence and therefore failed to describe the scourge. But he has collected seeds of learning from the ancients, of whom he cites a prodigious number, and he has added the knowledge gathered during forty years' practice in Montpellier and in Sicily and the teachings that he had imbibed from approved physicians. He regards pestilence as "a disease of corruption that infects the human body." He says it is sometimes brought by the wind. He quotes much astrological lore from Ptolemaus ("Phthous"), Algazel and other writers, and then proceeds to the practical advice which we have learnt to expect from these early writers. Avoid the infected and "rectify" the air, for these diseases are highly contagious. His fear is lest cold baths should close the pores of the skin and so prevent the evacuation of humors. Blascus says that Avicenna advises the use of a sponge filled with vinegar, but he hesitates to follow this advice lest the fever should be driven inward to the principal members. He gives a dietary and various remedies and the familiar system of phlebotomy.

---

[1] Cf. Galen, "Methodus Medendi," lib. ix, cap. xiv (Kühn, loc. cit., x, p. 648. Rhazes, "Liber Divisionum," cap. clviii, and De Renzi, loc. cit., ii, p. 740.

[2] Sloane, 428 (VI), fo. 145 recto to fo. 155 recto.

[3] A. Rubio y Lluch, "Documents per l'historia de la cultura catalana mig-eval," Barcelona, 1908; P. de Bofarull y Mascaro, "Coleccion de documents ineditos del archivo general de la corona de Aragon," Aragon, 1850, vi, p. 477, Document CXLVI.

[4] G. N. P. Alidosi, "Li Dottori Forestieri che in Bologna hanno letto Teologia, Filosofia, Medicina e Arti Liberali con li Rettori dello Studio da gli anni 1000 fino per tutto Maggio del 1623," Bologna, 1623, p. 13; and S. Mazzetti, "Repertorio di tutti i Professori Antichi e Moderni della famosa Universita e del celebre Istituto delle Scienze di Bologna," Bologna, 1847, p. 55.

[5] See the letter of introduction that he gave to Joan de Cruylles, who was travelling to the famous Italian city for the purpose of study. The letter is dated 1406, and Joan is described as the son of "our cherished councillor Bernardus," while from the end of the letter we learn that Bernardus was a physician. Rubio y Lluch, loc. cit., Document DIII, p. 418.

[6] "La Començe y Ferrer," "Carta Geografico-Historica de la Medicina Española," Madrid, 1886.

(XIII) TWO ANONYMOUS TRACTATES OF ABOUT THE MIDDLE OF THE FIFTEENTH CENTURY.

We here place two short MSS. dating from the fifteenth century. One of these is a homely regimen for preservation against the plague.[1] The advice given is on the same lines as that of John of Burgundy, Johannes Jacobus of Montpellier, and Bengt, though there is no mention of phlebotomy. In addition to the strictly temperate life and the fire in cold weather, the author recommends gentle exercise after meals and, like the Salernitan poem, he strongly deprecates sleep in daytime. When the time for sleep comes he advises that the head be raised somewhat, and he warns us on no account to sleep lying on the back.[2] He has also the warning, less easy to obey, to abstain from wrath and sorrow.

A second anonymous work of about the same date occurs in the same Erfurt volume as the "Missum Imperatori," described in Chapter X. It is entitled "Regulae technicae contra Pestilentiam."[3] The author introduces this little work by explaining that he proposes to follow the excellent custom of other physicians who send advice as to health to their friends and to famous men, and he thinks that a few "technical rules" for a preservative regimen will be acceptable, since "it is easier to maintain health than to conjure it back to the invalid." The first "technical rule" is repentance. The second is that we flee from an infected spot, and flee far, because the air quickly corrupts a whole region. Provided that the regions in the north and east have not become infected, our flight should be rather in that direction than south or west. If we are obliged to return to an infected spot, we must delay until the air has been thoroughly purified. The authorities quoted are Avicenna, the "Alexandrais" of one Galterus, and the "secretum secretorum," which was regarded in the Middle Ages as a genuine epistle sent by Aristotle to Alexander. The third rule is based on Rhazes, and concerns regular evacuations of the body, while the fourth sets forth the familiar rules for a moderate life, with the warning against superfluous baths that will open the pores. For has not Isaac Judæus said that bad air is more harmful than bad food? The fifth and last rule warns against crowds, and emphasizes the need of strict hygiene in the house. Both infected air and infected clothes may be dangerous: "Therefore the clothes of the dead should not be sold for a year or two and then only outside the boundaries of the town. For I have seen in Germany that the bedding of a woman dead of the pest was sold to defray expenses and touched by 2 children who both died. Similarly at Medemblik in Holland, where a woman died of the pest, her bed was placed in the sun, and was sniffed over by a pig who acquired the botch and died. Very wise, therefore, was the Italian custom at the beginning of the plague of burning such clothes instead of selling them." Tales such as those now quoted, illustrating the potency of the contagion, pervade the plague literature right down to the eighteenth century. It may be recalled that Boccaccio relates a similar misfortune to one of the porcine tribe in his Introduction to the "Decameron."

---

[1] Additional, 26,784 (XII), fo. 78 recto and verso.

[2] "Flos Medicinae Scholae Salerni," cap. v, De Renzi, loc. cit., v, p. 7.

[3] Additional, 4,897 (III), fo. 10 verso to fo. 12 verso, printed by Sudhoff, loc. cit., iv, p. 419.

(XIV) THE TRACTATE OF JOHN (OF SPEYER?), OF ABOUT THE MIDDLE OF THE FIFTEENTH CENTURY.

Another plague tractate in the same volume as the last tractate is by a certain John, perhaps of Speyer.[1] This writer again is difficult to identify. He is perhaps the Benedictine Prior, Johann Wishler de Spira, of Freynsheim, a small town in the Palatinate not far from Speyer. He lived from 1383 to 1456, and is known as a learned copyist and translator as well as a theological writer.[1] Or possibly our author is Johann Spierinck, Physician to Duke Philip of Burgundy, and Canon of the Church of St. Pierre at Louvain. Spierinck became Professor of Medicine in 1485, and was twice Rector of the University. He is said to have been prejudiced against foreign drugs, fearing that they might be mixed with poison by hostile hands.[2] The author of this little work is especially struck by the puzzling phenomena of contagion, in which he thinks terror as well as predisposition plays some part. He has the usual suspicion of marsh and mist, and is by no means an advocate of open air in these risky times. He notes that infection from corpses may travel sixty miles, and he gives minute directions for "rectifying" the air within doors. These measures must be supplemented by a strict and moderate life and by a cheerful spirit.

---

[1] Additional, 4,897 (XXV), fo. 262 recto to fo. 264 verso. The author is described as Jo. Sp(er). Various recipes by him are scattered throughout the Additional MS. 4,897. Possibly this John of Speyer is the Benedictine.

(XV) SOME ANONYMOUS ASTROLOGICAL TRACTATES OF THE FOURTEENTH AND FIFTEENTH CENTURIES.

(1) Mention should also here be made of the lost tractate of John of Burgundy, discussed in Chapter IV. The work "Gloriosus Deus" dates back to the fourteenth century.

(2) Yet another anonymous fourteenth century tractate[3] presents to us the purely astrological view of the pestilence. The author cites Ptolomaus ("Phthous") extensively. The remedy for the plague, it appears, is a thorough knowledge of astrology combined with a moderate diet.

(3) A late fourteenth century MS. in the Arundel[4] collection contains an astrological fragment on the pestilence, but unfortunately neither the beginning nor the end of the tract have been preserved.

(4) A beautifully written and illuminated early fifteenth century MS. in the British Museum would[5] have us believe that the dreadful visitation

---

[1] M. Kropff, "Bibliotheca Mellicensis," Vienna, 1737, pp. 256-297. John Wishler, of Speyer, was prior successively of Melk, in Lower Austria, and of "Cella St. Maria," perhaps Marienzell, in Würtemburg.

[2] A. G. de Beclièvre Hamal, "Biographie liégoise," Liége, 1830, i, p. 174.

[3] Sloane, 428 (VI), fo. 141 (VI), fo. 141 verso to fo. 144 verso.

[4] Arundel, 507 (XCI), fo. 91 recto to fo. 92 recto.

[5] Sloane, 965 (IX), fo. 143 verso to fo. 145 recto. This work follows immediately after an English version of the tract of John of Burdeaux, here attributed to "John de Burgoyne other wise cleped la barbe," and dated 1365.

is to be attributed solely to the Devil. The meteorological portents are described and also the symptoms by which we may recognize the activities of the Evil One.

(5) In a small document consisting of a couple of paragraphs, entitled "Signa Pestilentiae," of somewhat similar date,[1] astrological portents are described similar to those mentioned by Bengt.

(6) An astrological work dated 1484 formed part of the collection of the copyist Jean Baptiste Borrio de Labia. One chapter is entitled "De Pestilentia,"[2] and gives the relationship between the heavenly bodies and pestilence.

(XVI) THE "AMICUS MEDICORUM" OF JEAN GANIVÈTE, 1436.

The Franciscan Jean Ganivète is the author of "Amicus Medicorum," which he describes as "tractatus ad dirigendum phisicos in practica medicinae quo ad influenciam celi tam tempore pestilencie quam aliis temporibus anni." He writes in the year 1436 from a monastery at Vienne, on the River Rhône not far from Lyons, and he explains that he has been urged to the work by his friend Henry of Brussels, Master of Arts and of Medicine. The Museum MS. was written by Peter Sweydenitz de Desia, in the diocese of Breslau, in 1476, and the work was printed at Lyons in the same century.[3]

The "Amicus Medicorum" is a lengthy work, divided into four parts, or "doctrinae," each of which contains seven chapters. Ganivète explains that, whereas vultures in search of carrion are clearly guided by instinct, man must have recourse to the art of astrology. He suggests that pestilential epidemics may be caused by the flight of birds, and he relates the wondrous cure of Miriam, wrought by the prayers of Moses, adding that Moses wisely isolated the patient for seven days. But the prime concern of Ganivète is with the conjunctions of the heavenly bodies. These he discusses in great detail, explaining what they severally portend.

---

[1] Sloane, 783 B (XXIII), fo. 206 verso.

[2] Arundel, 88 (XV), fo. 56 recto and verso.

[3] Sloane, 1,680 (I), fo. 1 recto to fo. 42 recto. By John Trechsel, at Lyons, in 1496. A copy of this printed edition has been bound in the British Museum Additional MS., 29,250, where it occupies fo. 149 recto to fo. 186 verso.

(XVII) THE "ANAGLYPHORUM FLORENTIS" OF NICHOLAS DE DACIA, 1456.

Another work in the medico-astrological collection made by Peter Sweydenitz is the "Anaglyphorum Florentis" of Nicholas de Dacia.[1] According to one MS., Nicholas was a "Hungarian" member of the Order of Friar Preachers, and composed this work in their convent at "Mariologium" in the year 1456.[2] The "Anaglyphorum Florentis" deals entirely with astrology, and Nicholas shows himself to be steeped in Arabic lore on this subject. Notably he lays emphasis on the conjunctions that lead to pestilence.

(XVIII) THE TRACTATE OF GIOVANNI GARZONI (BETWEEN 1466 AND 1477), FROM NICCOLO FALCUCCI (DIED 1411).

A huge folio volume,[3] beautifully written by Henricus de Berg about the year 1477, gives various works by Giovanni Garzoni, including a compilation from the "De Febribus" of Nicolaus (Falcuccius) Florentinus.

Nicholas Falcuccius was a distinguished Florentine physician, who died in 1411. His family had been nobles, but left the party of the landed gentry and acquired the full citizenship of Florence. Nicolaus is himself buried in the cathedral, where a descendant erected a memorial to him in 1615.[4] His best-known work is the "Consilia Medica," a vast collection comprising seven "Sermones."[1] Both the whole work and extracts were several times printed during the fifteenth and sixteenth centuries. The "De Febribus" occupies Sermo 2.

---

[1] Sloane, 1,680 (IV), fo. 48 recto to fo. 130 recto. The paragraph on pestilence (fo. 81 recto) forms the opening of the first chapter of one of the numerous subsidiary tracts of this voluminous work.

[2] Cf. Quétif Echard, "Scriptores Ordinis Praedicatorum," Paris, 1719.

[3] Harleian, 3,747.

[4] D. M. Manni, "Osservazioni (e giunte) istoriche sopra i Sigilli Antichi de' secoli bassi," thirty vols., Florence, 1739-86, ii, pp. 18 *et seq.* The tomb gives 1412 as the date of Niccolo's death. It is believed, however, that he died in 1411. *See* Matthaeus Palmarius Florentinus, "De Temporibus," a continuation (from the years 449 to 1481) of the work of Eusebius. "Eusebius Caesariensis Chronicon id est Temporum Breviarium . . . quem Hieronymus Presbiter diuino eius ingenio latinum facere curavit. Et usque ad Valentum Cesarem Romano adiecit eloquio. Quem et Prosper deinde Matheus Palmerius Qui ea que consecuta sunt adiicere curavere eidem postpositi subsequunt," Venice, 1483, fo. 149 recto to fo. 150 recto. The works were several times reprinted. *See* also Mehus, in "Ambrosii Traversarii generalis Camaldulensium aliorumque ad ipsum et ad alios de eodem Ambrosio latinae epistolae a domino Petro Canneto Abbate Camaldulensi in libros XXV tributae . . . accedit eiusdem Ambrosii Vita in qua Historia Litteraria Florentina ab anno MCXCII ad annum MCCCCXL ex monumentis . . . editis deducta est a Laurentio Mehus," Florence, 1759, Preface, pp. xxviii, xxix.

The Garzoni were also a family of birth and distinction. Bernardo de Garzoni (died 1456) and his son Giovanni de Garzoni (1419-1505) both in turn professed medicine at the University of Bologna. Bernardo became Physician to Pope Nicholas V in 1448. His son studied Latin under Laurentius Valla, and was deeply influenced by the circle of Humanists assembled at the Papal Court. He is described as a brilliant orator and very learned. He was, moreover, a prolific historian, and was considered one of the best writers of the day. Modern historians find his work quite uncritical. On his father's death Giovanni returned to Bologna, and prosecuted his humanistic and medical studies. Unlike so many of the famous men of the period, he spent the remainder of his life in his native town. He successively occupied the chairs of philosophy and medicine, and his lectures were attended by a large concourse of pupils. In the public life of the city he was a prominent figure, and he held office several times. Moreover, Giovanni Garzoni was in active and successful practice, and we are not surprised to learn that he was expert in "judicial astrology."[2]

In our Harleian MS. passages by Giovanni de Garzoni himself are scattered throughout the epitomies by Nicolaus Falcuccius. Certain recipes against the pestilence[3] Henricus de Berg says that he has copied direct from the notebook of Giovanni, into which they had been written by his father, Bernardo de Garzoni. Chapters xxvi and xxvii[4] deal with the "Febre Pestilentia." Most justly does Giovanni de Garzoni explain: "Nycolus Florentinus scribit capitulum satis prolixum de cure febre pestilentia quod ego Jo de garcon in pauca rediga(m) nihil necessarium pretermittens." This compilation "de febre pestilentia" appears to have had some independent circulation, as another copy exists in

---

[1] Mehus, loc. cit., speaks of a further work, "De Peste," by Nicolo Falcuccio. He describes it as in two parts, "Pestis" and "Venenorum Materia," and says that it is dedicated to Duke Filippo Maria of Milan. The Abbot tells us that it was included with other medical works in a folio MS. belonging to Baron Philip de Stosch.

[2] Giovanni de Garzoni is buried in the cloisters of the Dominican convent at Bologna. *See* Fantuzzi, "Notizie degli Scrittori Bolognese," Bologna, 1784, iv, p. 80. Fantuzzi gives a formidable list of his works, published and in manuscript (iv, pp. 82-93), and he also prints some of his funeral orations (ix, pp. 115-128). Muratori, "Rerum, Italicarum Scriptoris," xxi, p. 1144, prints, from a Bologna MS., "De Dignitate Urbis Bononiae," dedicated by Giovanni Garzoni to Antonio Galeati Bentivoglio, who, in 1483, became apostolic pronotary.

[3] Fo. 229 recto to fo. 230 recto.

[4] Fo. 227 recto to fo. 228 recto.

Breslau;[1] in it, however, the name of "Jo de Garcon" is omitted from the introductory sentence above quoted. As regards the subject-matter of these short paragraphs, we encounter the familiar instructions as to diet and purification of the air, together with recipes.

After citing Gordon (perhaps the authority of Johannes Jacobus) that in diseases from poison many physicians are deceived because the urine is unaffected, we pass straight to the cure. This depends largely on diet, and both food and drink must be varied according to the strength and disposition of the patient and of the disease, as well as according to the humor by which the putridity is conveyed, and the season of the year. The liquid taken by the patient must lead to "digestion," "euacuation," and "alteration," with especial emphasis on the second. If the predominant material is sanguineous [*si materia vincens fuerit sanguinea*], recourse may be had to phlebotomy, which is otherwise strictly forbidden. Avenzoar, Guillielmus, and Avicenna are quoted.

A final paragraph of chapter xxvi gives recipes under the heading "Solutiua generalia in pestilencialibus. Ex Galetiano." Chapter xxvii is called "De Cura febre fleumatice pestilencialis a fleumati salso." It is explained that the fever may be combated by three methods—viz., by "the six naturals," or by the "5 intentions that may be observed in every fever," or by a "regimen of medicament." The regimen is set forth. It includes, besides a careful dietary, a choice of hot and dry air, exercise and rubbing, and many medicines, of which the recipe is given. A certain Antonius is mentioned as the authority for this chapter.

(XIX) THE TRACTATE OF THOMAS FFORESTIER, 1485.

A fifteenth century writer, contemporary of Bengt Knutsson, was Thomas fforestier, of Normandy, who wrote a work on the plague dated 1485, and dedicated "to Henry King of England and France and Lord of Scotland."[2] Henry VII became also Duke of Normandy on his accession to the English throne, and this work is doubtless a coronation offering from a loyal subject. In 1485 sweating sickness broke out in England, and it has been suggested that it was brought to this country from Rouen by the troops who fought for King Henry. An English version of Bengt's treatise was published in this same year.

---

[1] Printed, as an anonymous compilation from Falcuccius, by Sudhoff, loc. cit., vi, p. 338.

[2] Additional, 27,582 (II), fo. 70 recto to fo. 77 recto. Forestier was soon in trouble, for in the "Calendar of Patent Rolls of Henry VII's reign," Lond., 1914, i, p. 202, we find the following entry on Membrane 16 (11) of the year 1488: "General pardon of Thomas Forester, late of London, doctor in medicine, alias Thomas Forster, late of Westminster, 'phisicion, of all offences up to 29 Jan. last." He may have thought it wise to leave the country, for we have found no other trace of Forestier except his volume published in Rouen, 1490.

ffforestier does not advocate phlebotomy, but his work is otherwise on the same lines as that of Bengt, though he is even more emphatic in his warning against "false and advertising leches." This MS. work of fforestier was followed by a similar but longer version, printed at Rouen in 1490. The latter omits "sins" as one of the causes of the plague and goes straight to astrology. In it fforestier is yet more troubled by the harm wrought by ignorant physicians, and he devotes two chapters to the instruction of the poor in their choice of doctors!

There remain to be considered three fifteenth century MSS. of Italian origin. While these works show a continuity with the general tradition of the northern writers on the plague, it will be observed that Arabian influence appears, curiously enough, weaker in the south.

(XX) THE TRACTATE OF CRISTOFORO BARZIZA, OF BERGAMO, ABOUT 1435.

In a collection of medical works in an elegant but troublesome script of the fifteenth century occurs a tractate occupying but two folio pages, and entitled "Cura febris pestilencialis estive vel in tempore autumpri[1] euenientis magistri Xristoferis pergamensis."[2] The author of this treatise is Cristoforo Barziza, of Bergamo, nephew of the renowned grammarian Gasparino Barziza, of Padua. On the death of their father, in 1410, Gasparino adopted Cristoforo and his brothers and gave them the best education that Padua afforded. Cristoforo was both humanist and physician, and occupied the post of "Lettor Primario di Medicina" in the University from 1434 to 1440. A number of his works were printed in the course of the sixteenth century.[3]

---

[1] Cf. De Renzi, loc. cit., ii, p. 87.

[2] Sloane, 259 (III), fo. 49 recto (b) to fo. 50 recto (b).

[3] "Introductorium sine Janus ad opus practicum medicinae . . . compilatum per . . . Cristoforum de Barziziis de Pergamo," Pavia, 1494, and Cologne, 1518. We have seen only the latter edition, which describes our author as "Novello Ippocrate," "Monarca della Professione," &c. "De Febribus Cognitione et Cura" is included in various collections, such as the volume, "De Febribus," Venice, 1514, and, under the title, "Intentiones habende in Febribus," in the volume "Sta. Sophia Opus Aureum . . . Febrium," Lyons, 1517. This work has a chapter on pestilential fever quite distinct from our treatise. Other works of Barziza are the "De Balneis" incorporated in the volume "De Balneis," Venice, 1553, and an MS. commentary on Rhazes' "Almansor IX," in Paris, Bibliothèque Nationale, 4,870. We have encountered no reference to the tract on the pest. For further particulars of Cristoforo *see* Mazzuchelli, "Scrittori Italiani," ii, I, p. 496.

The views of Cristoforo are not unlike those in the plague tracts already considered, except that astrological lore is not invoked. The cause of the pestilence is again attributed to the air. Therefore, when the danger is about, windows must be kept fast closed, especially at night. Greenery should be placed in the room, also flowers such as roses, violets, &c., and a sponge saturated in vinegar. A dietary is prescribed, and in case of attack the patient is warned not to yield to sleep until treatment has been administered. Electuaries and clysters are recommended, and careful diet and above all phlebotomy. The rules for blood-letting are much like those we have encountered in the earlier treatises, though there are differences in some details. Cristoforo, for example, cites an hour and a half as the period beyond which phlebotomy should not be postponed. Among the numerous recipes is one to be administered "when there is pain in the back."

(XXI) THE TREATISE OF GIOVANNI CALORA, BETWEEN 1466 AND 1484.

Another pest tractate of Italian origin is by Giovanni Calora, of Medina,[1] physician to Lorenzo de Medici, to whom he addresses a fulsome dedication. This most beautifully written MS. occupies thirty-three sheets of an octavo volume, and it is divided into thirteen chapters. It is more elaborate and long-winded than the works already considered, but it follows more or less on the same lines, both as regards prophylaxis and treatment, though the author relies rather on dietary, electuaries and clysters than on phlebotomy, which is briefly mentioned in the concluding sentence.

Giovanni Calora emphasizes his belief in spontaneous generation with a vehemence which almost suggests that this theory had already found opponents. He considers that insects promote putridity, and he remarks "No wonder that contagion passes from one to another since the mere sight of a basilisk will kill."

---

[1] Egerton, 1,650. The MS. occupies thirty-three folios. Giovanni Calori, of Medina, is mentioned in various documents in the public archives of Florence. His will is dated 1484. He is described as "Magister" and "Enimium artium and medicinae doctor." In the Biblioteca Mediceo-Laurenziana is a manuscript "Compendium Febrium," also dedicated to Lorenzo the Magnificent. *See* A. G. Tiraboschi, "Biblioteca Modenese," Modena, 1781.

(XXII) THE TREATISE OF BENEDETTO DI REGUARDATI, OF NORCIA, BEFORE 1480.

Benedetto di Reguardati was another fifteenth century court physician. Born of good family at Norcia, in the Duchy of Spoleto, he became in 1426 professor of medicine at Perugia. He took some part in the public life of the town, and in 1438 he was one of the two envoys chosen to plead for clemency for Norcia before the conqueror Francisco Sforza.[1] In the course of the wars that distracted Italy at this period, Benedetto was banished from Norcia, and he took refuge with Sforza, who in 1447 entrusted him with a diplomatic mission to Pavia, Milan, and other Italian cities.[2] When his master attained to the dukedom of Milan, Benedetto remained in high favour and was appointed Chief Physician to the Court, as well as Senator. He was still living in 1482.[3]

Benedetto wrote an "Opus ad sanitatis conseruationem," which was printed several times in the fifteenth century.[4] His only other known work is the "Compendium de pestilentia," published at Milan in 1476, of which we have in the British Museum a fifteenth century manuscript English translation.[5]

Benedetto di Reguardati does not refer to phlebotomy or to the pathology of the three principal members' emunctories. In other respects, however, the thirty short chapters of his treatise follow the tradition of John of Burgundy and of Bengt both as regards the causes, prevention and treatment of the pestilence. He quotes many Arabian writers, but in his notion of the causes of the disease astrology is regarded as less important than meteorology; for like most Italian writers he regards the epidemics as seasonal. He explains that: "In the alteration of the firmament and the air enffection, ys gendered the morbe pestilencial, the whiche ys contagion," and he points out that a special danger is constituted when " the houssyng be standing tegederi." In this particular we may wish that Benedetto's treatise had been of greater influence.

---

[1] Muratori, "Rerum Italicorum Scriptoris," Milan, 1732.

[2] Muratori, loc. cit., p. 396.

[3] G. Marini, "Degli Archiatri Pontifici," Rome, 1784, p. 185. Marini shows that Benedetto did not, as is often asserted, occupy the post of papal archiater.

[4] At Rome in 1475, 1490, and 1493, and at Bologna in 1477.

[5] Sloane, 404 (II), fo. 243 verso to fo. 282 recto. Benedetto's treatise in this MS. precedes an English version of that of Bengt Knutsson. We have not seen the printed text of 1476. The English MS. version has a second "Chapter 19," advocating "fricacyon" or massage (cf. Averrois, "Colligit," lib. vii, cap. xxix). It is not mentioned in the Index, which gives instead "Cap. 20. How he came p^{s} to the fabricacyon." Perhaps this curious title is derived from the original Latin work.

APPENDIX.

The French Version of the Tractate of John of Burgundy.

The French version of the tractate of John of Burgundy is to be found in a beautifully written MS. at the Bibliothèque Nationale (Fr. n. a. 4,516) dating from 1371. The MS. is in the same volume and in the same handwriting as a French version of the "Travels of Sir John Mandeville." The volume opens as follows:—

[folio 1 recto]

> Comme il soit ainsi Ci co(m)mence le liure Jehan d(e)
> Mandeuille cheualier
> que la terre doultre mer
> cest assauoir la terre sainte. le quel parle de lestat
> la terre de promission entre de la terre sainte et des
> toutes autres soit la plus excellente merveilles

At the bottom of this page is written in a current hand of the seventeenth century, very faded and hardly legible, the following lines:—

> Messire Jean de Mandeuille estoit cheualier anglais Docteur
> en Medicine et a escrit son liure lan 1357

The account of the travels continues in the same handwriting to fo. 95 verso, where it ends with the following lines:—

[folio 95 verso]

> 19 en fin. Et si prie a dieu de qui tous biens et toute grace
> vient et descent que tous les lisaus et oyaus crestiens vueil-
> le de sa grace remplir leurs corps, et leurs ames sauuer ala
> gloire et loenge de luy. Qui est trinus et unus. senz (com)men-
> cement et senz fin. sens qualites bons. sens qualite grans
> en tous lieus presens. et en toutes choses comprenans et qui
> nuls biens ne puet amender. ne nuls mauls empuer. Qui
> en trinite parfaite vit et regne par tous siecles et par tous
> 27 temps. Amen.

There follow three blank lines, and then this *explicit* in the same handwriting as before:—

> Ce liure cy fist escrire honnorables honis sages & discret. Maistre
> Geruaise crestien. maistre en medicine. et premier phisicien de
> tres puissant noble et excellent prince: Charles par la grace de
> dieu: Roy de france. Escript par Raoulet dorliens. lan de grace
> mil. ccc. lxxi. le xviii^{e} Jour de Septembre.

The next page, fo. 96 recto, is occupied with an explanation of the Greek and the Coptic alphabet. At the bottom a passage written in Hebrew has been erased. The explanatory text is in the same handwriting as the travels.

Fo. 96 verso is blank.

Fo. 97 recto contains, in exactly the same hand, the beginning of the plague tractate of John of Burgundy, which we here transcribe in full, line for line. It extends to fo. 102 verso.

The ornaments of the travels of Sir John Mandeville and of the tractate of John of Burgundy are identical, and there is every reason to suppose that they were both written in 1371 by Raoul d'Orleans for Gervaise Crestien, Physician to Charles V.

In the transcript that follows we have introduced a number of headings. These headings, corresponding as they do to changes of matter or of style in our text, indicate the seams in the texture of the compilation.

Bibliothèque Nationale MS., Fr. n. a., 4,516.

[folio 97 recto]

TITLE.

Cest la preseruacion de Epidimie, minucion ou curacion
dicelle faite de maistre Jehan de Bourgoigne autrement dit
a la barbe professeur en medicine et Cytoien du liege:

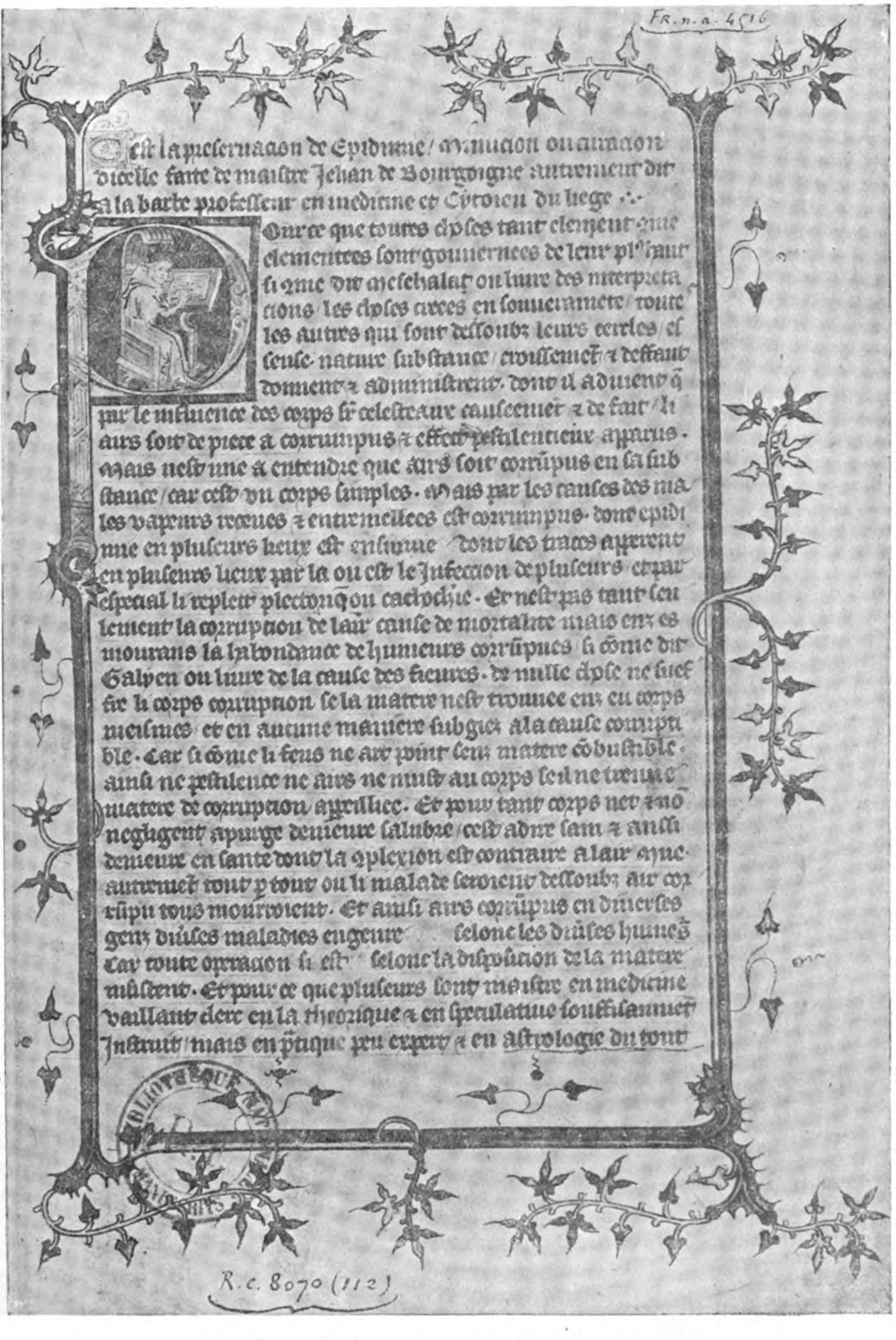
(1) ASTROLOGICAL INTRODUCTION.

Pour ce que toutes choses tant element (com)me
elementees sont gouuernees de leur pl(us) haut
si (com)me dit meschalak on liure des interpreta-
cions, les choses creees en souuerainete, toutes
les autres qui sont dessoubz leurs cercles, es-
sense nature substance, croisseme(n)t & deffaut
donnent & adminstrent. dont it aduient q(ue)

par le influence des corps s(u)r celesteaux causeeme(n)t & de fait, liairs soit de piece a corrumpus & effect pestilencieux apparus. Mais nest une a entendre que airs soit corru(m)pus en sa substance, car cest un corps simples. Mais par les causes des males uapeurs receues & entremellees est corrumpus. dont epidimie en plusieurs lieux est ensuiuie, dont les traces apperent en pluseurs lieux par la ou est le Infeccion de pluseurs, and par especial li replett plectorici ou cachoch(imic)ie. Et nest pas tant seulement la corruption de lair cause de mortalite mais euz es mourans la habondance de humeurs corru(m)pues si co(m)me dit Galyen on liure de la cause des fieures. de mille chose ne sueffre li corps corruption sela matere nest trouuee euz en corps meismes, et en aucune maniere subgiez ala cause corruptible. Car si co(m)me li feus ne ait point senz matere co(m)bustible. ainsi ne pestilence ne airs ne nuist au corps se il ne trenue matere de corruption app(ar)eilliee. Et pour tant corps net & no(n) negligent apurge demeure salubre, cest adire sain & aussi demeure en sante dont la (com)plexion est contraire a lair mue. autreme(n)t tout p(our) tout ou li malade seroient dessoubz air corru(m)pu tous mourroient. Et ainsi airs corru(m)pus en diuerses genz diu(er)ses maladies engenre selont les diu(er)ses hume(ur)s. Car toute operacion si est selont la disposicion de la matere insistent. Et pour ce que pluseurs sont maistre en medicine uaillant clerc en la theorique & en speculatiue souffisamme(n)t instruit, mais en p(ra)tique peu expert & en astrologie du tout

[folio 97 verso]

ignorant, la quelle est en phisique m(ou)lt necessaire, si (com)me tesmoigne ypocras en son epid(im)ie disant de quoy se mesle (?) phisiciens ignorans astrologie. nulz ne se doit mectre en ses mains. car li habituacions de astrologie et de art de medicine rieulent li uns lautre et m(ou)lt suppose lune scie(n)ce de lautre. car chascune en chascun ne se peut desclarier & m(ou)lt de fois lai trouue par exp(er)ience en pratiquant par lespace de XL. ans & plus que medicine donnee en constellacion (con)traire combien que selon lart de medicine fust bien composee et ordenee si ne ouuerroit elle mie selon lintencion de lartiste ne au proffit du pacient. en tele maniere que se medicine fust bailliee pour laschier aual, li paciens si le mectroit hors par dessus, combien que il ne eust mie en abhominacion la dite medicine. Et ainsi appert que cil qui nont mie beu du clare de la science de astrologie en maladies epidimieuses remede ne sceuent mettre. car la cause de la maladie et la qualite ont en ignorance (com)me dit li princes de medicine. Comment pourroies tu curer se tu ignores la cause. Et Auicernes de la



Fr. n. a. 4516

Cest la preseruacion de Epidimie / minucion ou curacion
dicelle faite de maistre Jehan de Bourgoigne autrement dit
a la barbe professeur en medicine et Citoien du liege ∴

Pour ce que toutes choses tant element que
elementees sont gouvernees de leur plus haut
si comme dit messehalat ou livre des interpreta
cions / les choses crees en souverainete / toute
les autres qui sont dessoubz leurs cercles / el
seuse nature substance / croissement et deffaut
donnent et administrent. dont il advient que
par le influence des corps souverains celestiaux causeement et de fait / li
airs soit de piece a corrumpus et effect pestilencieux apparus.
Mais nest mie a entendre que airs soit corrumpus en sa sub
stance / car cest un corps simples. Mais par les causes des ma
les vapeurs meues et entremellees est corrumpus. dont epidi
mie en pluseurs lieux est ensiuie dont les traces apperent
en pluseurs lieux par la ou est le Infeccion de pluseurs et par
especial li repletz plectorique ou cacochimie. Et nest pas tant seu
lement la corrupcion de lair cause de mortalite mais enz es
mourans la habondance de humeurs corrumpues si comme dit
Galyen ou livre de la cause des fievres. de nulle chose ne sueffre
li corps corrupcion se la matiere nest trouvee enz eu corps
meismes et en aucune maniere subgiez a la cause corrupti
ble. Car si comme li feus ne art point sens matiere combustible.
ainsi ne pestilence ne airs ne nuist au corps seil ne treuve
matiere de corrupcion apparilliee. Et pour tant corps net et non
negligent appurge demeure salubre / cest a dire sain et ainsi
demeure en sante dont la complexion est contraire a lair. Aultre
autrement tout par tout ou li malade seroient dessoubz air cor
rumpu tous mourroient. Et ainsi airs corrumpus en diverses
genz diverses maladies engendre selonc les diverses humeurs
Car toute operacion si est selonc la disposicion de la matiere
nuisient. Et pour ce que pluseurs sont maistre en medicine
vaillant clerc en la theorique et en speculative souffisanment
Instruit / mais en pratique peu expert et en astrologie du tout

BIBLIOTHÈQUE NAT

R. c. 8070 (112)

Bibliothèque Nationale, Fr. n. a., 4,516, folio 97 recto.

cure des fieures dit ce meismes. Qui ignore la cause cest impossibile que il puist curer. Ainsi le dit li philosophes. Sauoir nest autre chose que auoir cognoissance de la prouchaine et lointaine cause. Co(m)me dont les celestiennes soient les premieres causes il conuient deuenir a cognoissance dicelles. Car la cause souueraine ignoree, la cognoissance des derraines est ostee co(m)me la cause premiere plus influe en son effect q(ue) la cause seconde co(m)me il est escript ou premier des causes. Ainsi appert que senz astrologie en ce cas cy especial proffite peu phisique. pour quoy par deffaute de conseil m(ou)lt de genz perissent. Jay ueu en ceste temps une recepte par le maistre de coulongne monstree et contre le epidimie enuoiee au liege que en feist une confeccion de Rue figues & nois sel & miel a preseruacion de epidimie. et neentmoins contre epidimie na nul regart. mais bien(uaut) a preseruer de intoxicacion quant aucuns se crient destre empoisonnez bien vault a empech(i)r uenin, tant q(ue) autres remedes est bailliez mais contre les

[folio 98 recto]

maladies pestilencieuses na point deffect et ny ait aucuns fiance.

(2) Personal Introduction.

Et pour ce que ie Jehan de Bourgoigne autrement dit a la Barbe Cytoien de liege professeur en art de medicine neentmoins de tous phisiciens le mendres qui du te(m)ps passe au co(m)mencement de ceste epidimie de la cause & nature de leur corrupcion selon le iugement de astrologie, fis un tractie du quel m(ou)lt en eurent copie. et co(m)mence. Deus deorum d(omi)n(u)s etc.
Qui simplement et absoluteme(n)t de toutes entitez est premiere cause &c. Item fis vn autre traictie de la distinccion des maladies pestilencieuses des autres maladies qui se (com)mence Cu(m) nimiru(m) p(ro)pt(er) instans tempus epidimiale, &c. Es quelz se aucu(n)s a la copie apreseruacion & cure pluseurs choses trouu(er)a non mie (?) toutesuoies toutes choses a cure appartenans. Et pour ce q(ue) eu ceste instans epidimie, ainsi que de nouuel reco(m)menciee et par succession de temps encore & encore retournera car nest mie maintenant la fin. Pour ce aians (com)passion sur le perissement de creature entendans et insistans aussi au co(m)mun proffit, salut de tous deuoir desirier convoitans en yceste cedule la diuine aide a ce deuotement appelee preseruacion et cure de ces maladies plus plainement et plus parfondement declarier entendre a ce que nul nait mestier de phisicien au besoing. mais chascun soit recteur gouuerneeur et preseruateur de luy meismes

(3) PROPHYLAXIS.

Au premier & a preseruacion eschiue tout ho(m)me trop g(ra)nt replecion de boires & de mengiers. Eschiue bains q(ue) corps [rarefient et] les pores eslargissent. Car qu(an)t les pores sont ouuers adont entre lair venimeus percant le corps & corru(m)pant les esp(er)is. Et sur toutes choses copulacions charnelees sont a eschiuer. De fruis peu ou neent mengier seles fruis ne sont aigres. Et doit vser de viandes de legiere digestion. et vin aromatique tempre. Si doit on fuyr miel et toutes choses confecte(e)s dicelui. et soient toutes viandes (com)posee(s) et confectes de bon et fort vin aigre. Et en te(m)ps de froidure & pluyeus on face feu en chambre. et quant il sera te(m)ps bruyne(us) et trouble an matin aincois que on isse, se il est riche ho(m)me

[folio 98 verso]

face remede daromatiques, co(m)me dyambra, dyamusco dyantos & musco pliris & musco et choses semblables. Sil est poures use de zedoar clous de giroffle nois muscades macis &c. et une fois ou deux la sepmaine preingne de bon triacle app(ri ?)uue a la quantite dune feue. et porte en la main une po(m)me da(m)bre ou aucune chose aromatique de grant odeur. Et au vespre a lentree du lit les fenestres closes face flamber de buche de rai(mi ?) s(c)eaux de geneure a ce que lodeur de la fumee remplisse la cha(m)bre. ou mecte en. i. creusillon de terre. iij. ou. iiij. charbons vis et mecte on sus de pouldre ci apres deuisee a ce que la fumee entre par la bouche et narines. Et puis apres voise couchier. ℞ olibani albi ℥ j. lapdani ℥. iiii. storacis calami seu thumamatis ʒ. ii. ligni aloes ʒ j. et face on poudre soubtille & deliee et soit fait toutes fois que lair est puant ou q(ue) len sent mauuaise oudeur. Et ainsi alaide de dieu en te(m)ps froit bruyneus, ou corru(m)pu effect de mauuais accide(n)t po(ur)ra estre preseruez

Et se epidimie est regnant en temps exceda(n)t en chaleur adont se conuient gouuerner par autre regime(n). et de choses plus froides vser et plus sobrement mengier q(ue) en froit temps et plus exceder en boire q(ue) en mengier et vser de vin blanc bien tempre. et en viandes vser de vin aigre en grant copie e de surele et choses aigres. et eschiuer espicerie chaude co(m)me poiure garingal graine de paradis &c. Et au matin aincois que il isse de la maison se le temps est bruyneus & lair mal dispose, adont doit odourer roses violetes flouretes de ne nufar, blanche et vermeille. muscacelines & camphre. et de triacle peu vser en temps de chaleur, excepte gens fleumatiques et de froide complexion. car sanguin et colerique nen doiuent point vser en chaut temps. mais preingnent po(m)mes de granade dorenge et de sitron confites que on dit citro(n)nat. ou de t(ri)asandali ou de electuaire froit cophonis & dautres choses froides. Et doit on vser de porees de cucumes de courges, fenouil violiers bethes borag bugloss &c. Et se garde on daux & doignons de poiraux et dautre chose qui trop eschauffe co(m)me poiure graine de paradis &c. mais ginge(n)bre canelle saffren et autres espices a

[folio 99 recto]

temprees. Et se pour la ferveur du temps il ont soif trop forment boiuent eaue froide & de vin aigres enz, ou tysane. car m(ou)lt aide as personnes qui ont les corps chaux et ses et de te(n)ue habituacio(n) et ne doit nul en cel temps grant soif souffrir. Item se aucuns sent sanc voleter ou poindre, tantost soit faite seingniee de ce meisme coste de la vai(n)ne plus prouchaine. et le pauement de la chambre ou il gist, de eaue froide meslee de vin aigre soit souvent arrouse. Et sil est riches deaue rose auec vin aigre. jj. ou trois fois le iour. Item pilules rasis sont bonnes en p(re)seruacio(n) se elles sont prises vne fois en la sepmanie et valent a toute complexion et en tous temps froit et chaut. mais ne oo(m)petent fors aus replez. les quelz Auicerne & m(ou)lt dautres aucteurs commandent, petit lachent. mais les humeurs corru(m)pues petit et petit euacuent & sont teles. ℞ Aloe cicot(r)in ʒss mirre croci āā ʒ. ij. soient faites pillules auec sirop de fun de terre et de ʒ. j. & ss fiant pillule. et sit dosis vne. Et qui de ces choses vse et il est de bon gouuernement contre lair corru(m)pu et parle moyen de layde de dieu pourra estre preserue.

(4) PATHOLOGICAL THEORY, &C.

Or est asauoir se aucuns par deffaut de bon Regimen chiece en maladie epidimieuse pourueoir faut de remede. & est asauoir que ces maladies pestilencieuses & epidimeles dedenz vn iour natural. cest adire dedenz. xxiiij. heures sont fourmees en corps humain, pour quoy il est necessitez de remede. Si est assauoir premierement que en corps humain sont. iij. me(m)bres principaulx. cest asauoir le cuer, le foie & le ceruel. et chascun deulz a son emu(n)ctore ou ilz enuoient leur sup(er)fluitez. do(n)t dessouz les esseles sont les emu(n)ctores du cuer. Les emu(n)ctores du foie sont en laine. et les emu(n)ctores du ceruel sont dessouz loreille ou la gorge. Or deuez savoir que tout venin a de la substance nature a destruire co(m)me il appert en morsure de serpent & dautres bestes enuenimees. et ainsi tel air enuenime quant il se mesle auec le sanc il demande tantost le cuer co(m)me le fondement de nature a ce quil le face perir. et le cuer sentant son nuysant se efforte de soy deffendre. et le sanc infect & intoxiquie enuoie a son emu(n)ctore. et se la matere enuenimee treuue les voies opilees

[folio 99 verso]

cest adire, estoupees si quelle ne puist droit chemin au cuer monter. il demande autre membre principal, cest le foie afin q(ue) en celi ou par celi, il destruise nature. le foie donques resistant enuoie aussi la matere nuysant a son emu(n)ctore. et ce mesmes est adire du ceruel.

(5) THERAPEUSIS.

pour quoy par telz accidens qui sont au phisicien signe, est clerement monstre en quel lieu de la matiere la miniere se repont. et par quelle vaine il est a euacuer. Car se le sanc infect & intoxiquie est enuoie dessouz les esseles on scet q(ue) le cuer est greue & a asouffrir pour quoy la minucion tantost doit estre faite de la cordiace. cest adire de la vaine du cuer et de ce coste dont la maladie est. et non de la partie opposite. car il ensuiuroit. ij. inconueniens. lun est que le bon sanc estant en la partie non corru(m)pue seroit traict. Secondement que le sanc corrupt & intoxiquie seroit traict a la partie saine. et qui pis est le sanc enuenime passeroit par la region du cuer & le intoxiqueroit et tost la cause de mourir metroit. et se vers la region du foie il sent aucune pu(n)ccion, tantost se doit flemer on dextre bras et la est la vaine du foie dessoux la vaine du cuer. ou on le face de la saluatele qui est entre le petit doy auricular(e) et le doy medicin (!) Et se le foie blecie enuoie son meschief a laine et delez le secre meebre naturel appert plus vers la cuisse & au p(ar) dedenz dont doit estre ouuerte la vai(n)ne du pie et de ce lez, entre le grant orteil du pie et son plus prouchain. Car se adont on faisoit la minucion ou bras, la matiere seroit arriere es retraicte au noble membre. et dont seroit plus grant inco(n)uenient. Et se la boce de laine est plus vers le lez distant du secre membre dont doit estre ouuerte la vaine du pie de ce coste entre le petit orteil et son prouchain. ou entre la cheuille & le talon. ou on doit garser delez la boce en crois. Et se la boce sembat en lemu(n)ctore de ceruel en col ou dessouz la gueule dont doit on faire la seigniee du bras de ce costo et de la vaine du chief. et est desseure la moien ne vaine. ou on le face seignier de la vaine sus la main entre le pouce & le doy demonstratif son prouchain. ou on se face garser entre les epaules.

Et se le sanc enuenime ainsi extrai(c)t et le membre principal ainsi depure. le cuer doit estre conforte de elec-

[folio 100 recto]

tuaires et aussi les autres membres principaulx de electuaires froiz cordiauls et inflamacion de fieure de boutans, sic ℞ poudre de dyarodon albis t(ri)asandali, requiei, diadraganti frigidi puluer(is) resu(m)ptini āā ʒ.j. zucar(is) rosar(um) optime. ʒ.v. et soit fait electuaire par morceaux. et le doit on prendre plusieurs foiz le iour et la nuit. Item peut on faire eaue distilacion de diptan de pimp(er)nele, ou sochet. de tormentile & de scabieuse. de chascune herbe a par ly. et puis leaue egalment mesler. et y celle eaue meslee seroit donnee a boire en ces maladies. Noble et seure seroit medicine. Et diete en ces maladies soit tenue (com)me en fieure co(n)tinue. car toudis en tele maladie se fiert fieure. ne nulles chars ne sont a octroier, fors aucunes foiz petiz poucins cuiz auec eaue et surele. mais poissons a escaille rostis sur le grail auecques vin aigre, ou s(o)urcle font a mengier, et lait damandes bouly & tisane ou petite ceruoise. Et se il conuient pour linstance du malade donner du vin, il soit meslez de vin aigre & de m(ou)lt deaue & sur le boce soit mis cest emplastre no(m)me Emanuel le plus g(ra)nt ℞ racine de potentille ou sochet ℥iij boli ʒ.ij. racine de yeble ʒj racine de semerion ʒss. semence de rue ʒ.j. et soient confictes auec camomille un pou de cire et un poi de resine de pin et soit fait oingnement non une trop mol, et soit mis sus, et sort renoueles .ij. fois ou .iij. le iour, ou remue. Cest oingneme(n)t sache la matiere venimeuse ali & lassemble & mortifie. et ne sueffre plus la dite matiere retourner aux membres principaulx, ne eulz blecier. Car se il demouroit par toute la vie apres la mortificacion de nature il ne pourroit nuyre. Toutefouies se on veult du tout la boce oster. on mecte apres ce, maturatiues avec dissolutiues de quoy tout cyrurgien doiuent estre tuit pourueu. Item se aucuns veult vser de ceste poudre qui vault apreseruacion & a cure, et est noble medicine et mieulx vault en tel cas que triacle. et est dite poudre imperial. car li imperial des pay(n)es en vsent pour ce que contre epidimie, et contre tous empoisonnemenz. et contre toutes morsures de serpenz vaut. et contre morsures de toutes bestes. et est dit en langue arabique bethzaar qui vault adire deliurant de mort. Et est faite cest poudre de

[folio 100 verso]

ces herbes ℞ de palamenon ou diptan de philadelplia ou pinpernelle de latipharon ou tourm(en)tille auec autres auec bol armenic & terre scellee des quelles herbes ie puis dire & affermer car cent fois les ay esprouuees que chascune des dites herbes entrant en la dite poudre chascune par li et simplement preserue et cure de tout venins car chascune par li triblee broisee & beue avec uin tantost euacue venin et par le lieu de morsure de serpent vertueusement & tost enchace. Et ainsi que le Sanc senua par seigniee de la vaine. poi dapoticaires de ces herbes ont cognoissa(n)ce. neis nos aucteurs de elles font petite mencion car il nen ont mie veu lexperience et neentmoins il a un apoticaire au liege qui generalment & especialment les cognoist. et dient les anciens philosophes que qui conques use de celle poudre cest co(m)me impossible que il puist morir de epidimie ne par venim.

(6) ASTROLOGICAL EPILOGUE.

Item ne croie nulz que ceste pestilence soit pour la raison de Saturne & de iupiter pour la coniunccion qui se fist deulz & dautres lan passe cest assauoir en lan LXV. aincois dient des reliques de lautre coniunccion autresfoiz faite de lan XLV dont les traces apperent encore en effect. Lautre coniunccion fist son influence & pestilence tant seulement en & sur corps humain mais aussi en besteaulx cherra la pestilence et m(ou)lt dautres maulx par succession de temps seront seme en monde co(m)me grans guerres mutacions de royaumes et de sectes et destruccions dautres sectes paours angoisses riotes & discordes famines mortalitez. de paup(er)acions de richesce de m(ou)lt et occisions de puissans ho(m)mes destruccion de sectes de sarrasins & (de) m(ou)lt de pluyes. et en pluseurs lieux grans deluges deffaut de fruiz et m(ou)lt de perilz aceulz qui passeront la mer et m(ou)lt de signes et es pouentauz app(er)ont en lair. et seront m(ou)lt de tonnoirres & de foudres et de soufflemens de vens fors & vertueux et par tres grans tempestes et sera en leglyse tribulacion grande & discorde & oppression daucuns grans prelas et de ministries de leglyse & m(ou)lt imoppinees merueilleuses et esbahissans par succession de temps dont en singulier seroit lonc a raconter et non mie tost ces choses auenront mais passe trois ans de ceste nou-

[folio 101 recto]

uelle coniunccion a compter les grans merueilles plus q(ue) deuant app(er)ont et co(m)menceront a pululer cest assauoir destrempance (?)dair froidures pluyes et grans diminucions dyaues et apres grans deluges et mundacions deaues et deffaux de fruis et moult dautres en ces trois annees app(er)ront. Mais les grans adueneme(n)s se tarderont encore de uenir. de ces & en autres aduersitez nous uueille dieu gouuerner. Amen.

(7) POSTSCRIPT.

Aucuns mont demande co(m)ment ce en ceste cedule le doit entendre quant on dit que on Se face tost sai(n)gnier. se ce mot ci tantost determine le premier ou le secont iour. car ce so(n)t les (com)mencemens de la maladie. aus quels iay ainsi dit q(ue) ces maladies ainsi pestilencieuses sont breues et soudaines et ont hastiue terminacion pour quoy ce qui regarde la cure ne req(u)iert procrastinacion. ne dilacion pour quoy le saignier qui est le co(m)mencement de la cure ne doit point retarder. et ne doit pas attendre le premier ne le secont iour. mais en celle meisme heure q(ue) la maladie ahert. le barbier puet venir ou face la minucion de la vaine p(re)cedente de la miniere de la matiere de la maladie cest asauoir du lieu ou la maladie apprit. Et se la minucion ne se peut faire en celle meisme heure. toutesfois on le face dedenz les vj heures. Et se ainsi ne ainsi on ne le peut faire bonnement le pacient se abstiengne de boire & de mengier iusques a tant que il sera saigniez. et toutesuoies il se garde en toutes manieres que la minucion ne soit tardee oultre xij heures car se elle nest faite dedenz xij heures entretant que la matiere est en (b)on mouuement, il ne proffite point a sante. et se la minucion est tardee iusques a la confirmacion. et apres elle est faite. cest certain que nuyre ne puet. mais nest mie certain quelle puist deliurer du peril de mort. car le mauuais sanc est coagule & assemble et espessi. et si que de vaine ferue a paines peut issir. Et se apres le saignier la boce sengroisse. dont doit on saignier seconde fois en celle vaine & dessouz lautre du lieu de la minere de la maladie precedent. et apres soient donnees V cueillerees deaue des herbes deuant dites mixtionnees. Et se tant nen peut auoir au mains une cuilleree au matin et lautre au soir. et

[folio 101 verso]

tantost apres mengier le electuaire dessus dit. ou on li doinst de cestre confeccion confortatif pour le cuer. et les males fumes enchace. et pour fieure et le mal estaint. et peut estre donnee atoute heure de iour et de nuyt. ℞ Conserue violar(um). cons(er)ue rosar(um) conserue buglose. conserue boraginis. conserue citranglor(um) āā ʒ. iij. puluer(is) dyarodon alb [at] is. dyadragant (i) frigidi. t(ri)asandal(i). puluer(is) resumptini, pulu(er)is electuar(ii) frigidi cophonis āā ʒ ss zucar(e) rosac(e) fracte, qui suffise. et soient mixtione senz feu et en une boiste. Et se le pacient est de chaude compleccion et la fieure caude et ague, on mesle auec ce dessus dit. vi. ou. viii grains de canfre. Et se le malade est riche, on mecte auec les choses dessus dites de perles. (ou) margarite or fueilly. argent pur iacinct esmeragde. et os de cuer de cerf. et est certain e par experience longue de. xx. ans et plus en m(ou)lt de lieux ou epidimie a regne, que teleminucion auec le regimen dessus dit, deliure le pacient de peril de mort. Et m(ou)lt pour seule minucion faite en temps deu senz autre benefice de medicine sont cure. Mais pour ce q(ui) oultre le temps deu lont retarde. incertain est a sauoir quil leur ait proffite a cure. car com(m)e nature meuve toute matiere, et le cuer par la vertue expulsiue. cest a dire boutant hors tout sanc infect & nuysant, le boute a son emunctore co(m)me dessus est dit. en ce mouuement de matiere doit nature estre aidiee par minucion. car par la minucion et extraction de sanc est (con)fortee lexpulsive du cuer et matiere diminuee. car nature est plus puissant sur le remanant et par le benefice de medicine & pl(us) legierement curee. ne ne vi onques par ceste voie fleme et p(ar) ceste forme se il se gouuerna bien et le confortatif du cuer receust qui ne fust deliures de peril de mort. Dont ie nose dire non mie a lopp(ro)bre des aucteurs. mais par longue exp(er)ience qui le ma monstre, que les maistres du temps present en quel terre que ilz soient en ces maladies pestilencieuses, experience yvault mieulx que tout li art de medicine qui de ca ypocras descendirent, car nuls en leur temps ne vit epidimie regner fors tant seulement ypocras qui la vit regner en la cite de Craton. et ne dura mie plante. Et nee(n)t

[folio 102 recto]

moins, de ce quil en vit sen fist il vn liure qui se no(m)me de Epidimie. et le liure de p(er)itonomozaton. mais Galyen, diascorides. Rasis, Haly, Rufus. damascenus. hesben, mesue, copho. constantinus. serapion. auicerne. auerroys. algazael et les autres ensuyuanz ne virent onques epidimie si general ne si longue ne cures si longues ne si exp(er)imenteles p(ar) si longue experience nenquerirent ne esprouuerent. Et quanquil en ont dit ilz lont pris apres ypocras. Et neentmoins dist auerroys, que en liure depidimie. ypocras sen passa legierement. et tracta assez confusement. non mie p(ar) deffaut dengin, ne de raison. mais pour ce quil nout mie longue experience. car experience ce qui est repris descueuure et la chose ramaine de puissance en fait. Pour quoy dist le philosophe en livre du ciel et du monde, encore parlant dexp(er)ience que trois choses furent qui firent ypocras en natureles choses, errer souuent cest assauoir inexperience. confidence de p(ro)pre engin. et ignorance de logique. pour quoy les maistres du temps present vsent plus es choses dessus dittes de experience, que ceuls qui nous ont passes. Et ainsi quil est dit et voirs est experience fail lart. et ce dist aristotes. pour quoy saucun en lart de medicine expert de cest pestilence et de ses accidens de preseruacion et cure a perpetuele memoire veult aucune chose composer selon lexperience du temps (p)resent en toutes compleccions approuuees, plus plainement et plus parfaitement senz comp(ar)aison et plus proffitablement toutes choses pourra app(ro)fondir que tous les liures de medicine que on dit & compile des le co(m)mencement du monde ne feroient.

(8) EPILOGUE.

Le maistre de ceste oeuure meu de compacion & de pitie doulant le deffaut & le meschief de humaine creature ay fait cest present escript et selon anothomie des maladies pestilencieuses, a saigniees necessaires ay distinte & desclairie a ce que chascun de lui meismes puist estre medicin Et pour ce que ces maladies sont de brieue terminacion et la matiere furieuse, chascun face minution, conseil de

[folio 102 verso]

maistre non actendant. car m(ou)lt de fois le tarder engendre peril

Non pour pris. mais pour prieres ai ceci fait. a ce q(ue) ceulz qui auront sante & (con)ualescence par le dessus dit vueillent dieu prier pour moy.

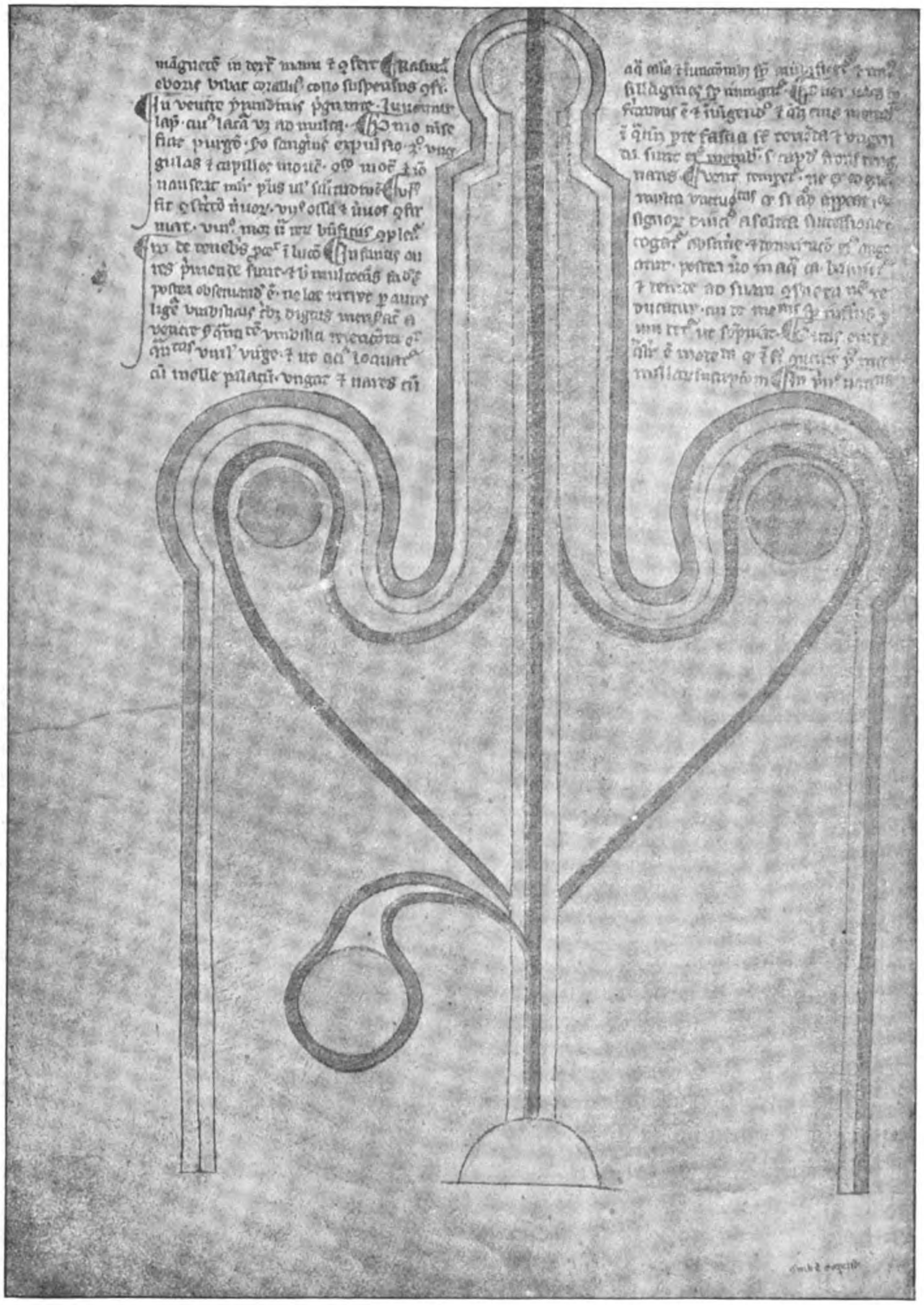
Explicit le traictee maistre Jehan ala barbe docteur en medicine compile a liege en la quelle ville il a fait m(ou)lt dautres nobles tractiez de la science, non oys autrefoiz. et le fist lan Mil CCC.LXV.

(Communicated, and taken as read.)

Note on a Thirteenth Century Diagram of the Male Genitalia.

By CHARLES SINGER, M.D.

ON pages 43 to 47 of the present volume of the *Proceedings of the Royal Society of Medicine* (Section of the History of Medicine) is described a thirteenth century drawing of the anatomy of the uterus and adnexa from the Bodleian MS., Ashmole 399. The present note



Thirteenth century diagram of the male genitalia.

deals with what is apparently the fellow-diagram of the anatomy of the female genitalia.

The figure in question occurs on folio 24 verso of the MS. The page has been over-written in a neat hand of the late thirteenth century. The subject of this writing is a treatise which calls itself "Liber de aegritudine mulierum . . . e Galeni Hippocraticis et Constantini libris . . . confectus." This treatise covers fo. 21 to fo. 26; it has no reference to the figure and does not concern us here. The only other lettering on folio 24 verso is a partially erased phrase written in the same hand as the legends on the figure of the female genitalia. The phrase ends " . . . est coop[er]end[u]s " (. . . should be covered). No other words are legible.

The figure, like that of the female genitalia, presents us with an idealized section of the parts which it seeks to interpret. Down the middle of the page runs a thick dark line representing the duct of the urethra arising in the bladder. This latter organ is indicated by a semicircle below. The walls of the urethra are indicated in much the same way as were those of the vagina in the companion picture, with which this should be compared. The urethra is shown in its course through the penis; the corpora cavernosa, the glans and the preputial fold are indicated.

On either side of the penis are the testicles, represented as round bodies in the same way as the ovaries of the companion picture. Each testicle is in its separate sac. Around each testicle passes the spermatic cord to open into the urethra near the neck of the bladder. The devious course of the testicular duct has been misunderstood by the draughtsman, who brings it again into relation with the urethra at the root of the penis.

Near the neck of the bladder another glandular structure is represented as opening into the urethra. This is perhaps the prostate gland, or at least indicates an appreciation on the draughtsman's part of the presence of complex structures in this region.

The two pictures, one of the male and the other of the female genitalia, should be examined together. It is regretted that the exigencies of the time led us to overlook the picture illustrating the present note when the previous note was published.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

LARYNGOLOGICAL SECTION

1805-1834

1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Laryngological Section.

OFFICERS FOR THE SESSION 1915-16.

President—

James W. Bond, M.D.

Vice-Presidents—

Adolph Bronner, M.D.
James Donelan, M.B.
G. William Hill, M.D.
W. Jobson Horne, M.D.
H. Lambert Lack, M.D., F.R.C.S.
D. R. Paterson, M.D.
Sir Robert H. Woods, F.R.C.S.I.

Hon. Secretaries—

Cecil I. Graham, F.R.C.S.
Frank A. Rose, F.R.C.S.
(Acting for Mr. W. D. Harmer, M.C., and Mr. C. W. M. Hope, F.R.C.S., on Active Service.)

Other Members of Council—

G. W. Badgerow, F.R.C.S.Ed.
Cecil I. Graham, F.R.C.S.
Thomas Guthrie, F.R.C.S.
W. G. Howarth, F.R.C.S.
H. Buckland Jones, M.B.
E. A. Peters, M.D.
F. A. Rose, F.R.C.S.
Andrew Wylie, M.D.

Representative on Library Committee—

Dan McKenzie, M.D.

Representative on Editorial Committee—

L. H. Pegler, M.D.

LARYNGOLOGICAL SECTION.

CONTENTS.

November 5, 1915.

By PERRY GOLDSMITH, Major C.A.M.C. (Toronto). PAGE

(1) Bullet entering below Right Mastoid and emerging at Left Orbit ... 1

(2) Traumatic Paralysis of the Left Vocal Cord 2

Encapsulated Tumour removed from Region of Left Tonsil, Soft Palate, &c. By J. W. BOND, M.D. 4

Tumour of Palate. By GEORGE BADGEROW, F.R.C.S. 4

Intrinsic Cancer of the Larynx, One Year after Operation by Laryngo-fissure. By Sir STCLAIR THOMSON, M.D. 6

By HUNTER TOD, F.R.C.S.

(1) Congenital Fistula of the Nose 9

(2) Malignant Papillomatous Growth of Left Inferior Turbinate and Ethmoidal Region 10

By J. L. IRWIN MOORE, M.B.

(1) Chronic Suppuration of the Left Frontal, Ethmoidal and Maxillary Sinuses 12

(2) A Nasopharyngeal Polypus (Choanal Polypus) originating in the Right Maxillary Antrum 15

(3) Final Notes on a Case of Malignant Stricture of the Œsophagus, situated ¾ in. above the Sternal Notch 17

Bullet Wounds of Face and Neck. By W. STUART-LOW, F.R.C.S. 18

Paralysis of Left Vocal Cord from Bullet Wound of Neck. By DAN MCKENZIE, M.D. 20

Bullet Wound of Face. By ANDREW WYLIE, M.D. 21

By L. H. PEGLER, M.D.

(1) Shrapnel Wound of Nose and Cheek 21

(2) Disease (Empyema) of Right Frontal Sinus 22

Demonstration of Simpson Light Apparatus: Cases illustrating Results obtained by Use of Simpson Light. By W. DOUGLAS HARMER, M.C. 23

December 3, 1915.

By **Irwin Moore**, M.B. PAGE
- (1) The Histology of an Angeio-fibroma of the Nasopharynx and its important Bearing on Operative Procedures 25
- (2) Some New Instruments specially designed for Improving the Technique of the Operation of Laryngo-fissure (Thyrotomy) ... 34

Paralysis of the Right Vocal Cord resulting from a Bullet Wound. By F. A. **Rose**, F.R.C.S. 36

Unilateral (Left) Paralysis of Soft Palate and Larynx. By **Charles A. Parker**, F.R.C.S.Ed. 38

By **Irwin Moore**, M.B.
- (1) Malignant Disease (?) of the Arytæno-epiglottic Fold and Ventricular Region of the Left Side of Larynx 39
- (2) Halfpenny impacted for Five Days in the Œsophagus of a Child, aged 4 39

By D. R. **Paterson**, M.D.
- (1) Tin Disk, 1⅜ in. in Diameter, removed from the Gullet by the Direct Method 41
- (2) Large Irregular Piece of Bone, impacted in the Œsophagus, removed by Direct Method; Death from Sepsis Six Days later 41

By **Irwin Moore**, M.B.
- (1) Laryngeal Case for Diagnosis 45
- (2) Case for Diagnosis 45

By **Herbert Tilley**, F.R.C.S.
- (1) Chronic Dacryocystitis cured by West's Intranasal Operation after Failure by External Operation 46
- (2) Microscopic Specimen of Recurrent Epithelioma removed from the remains of the Right Ventricular Band of a Patient who had been Operated upon for Epithelioma of the Right Vocal Cord Nine Years ago 48

By W. M. **Mollison**, M.C.
- (1) Carcinoma of the Superior Maxilla with Secondary Glands in the Neck; Operation; no Recurrence after Two Years 49
- (2) Sarcoma of the Ethmoid; Operation 49
- (3) Sarcoma of the Tonsil (?); Mass of Glands in Neck; Removal of Tonsil 50

By H. **Lambert Lack**, F.R.C.S.
- (1) Two Specimens of Exostosis from the Frontal Sinuses and Ethmoidal Cells 51
- (2) Tracheitis Sicca in a Boy 52

By **Dan McKenzie**, M.D.
- (1) Papilloma of Larynx in a Child treated under Suspension Laryngoscopy 53
- (2) Long-continued Spasm of the Œsophagus 54

By WILLIAM HILL, M.D. PAGE
- (1) Child with Enlargement of External Nose 56
- (2) Pharyngo-laryngeal Carcinoma 57
- (3) Epithelioma of Epiglottis 57

Ulceration of Pharynx. By GEORGE W. BADGEROW, F.R.C.S. 57

February 4, 1916.

Tumour in Region of Right Tonsil and Soft Palate. By J. W. BOND, M.D. ... 59

Extensive Scarring of the Face. By J. EDMOND, M.B. 59

Cases shown by NORMAN PATTERSON, F.R.C.S.
- (1) Foreign Body (Fish-bone) in Œsophagus, followed by Abscess in Neck 60
- (2) Sarcoma of Nasopharynx and Cervical Glands; Result of Treatment 61

Partial Excision of the Thyroid Cartilage as an Alternative to Thyrotomy in Malignant Disease of the Vocal Cords. By H. LAMBERT LACK, F.R.C.S. ... 62

Total Laryngectomy for Cancer, Three Years after Operation. By DAN McKENZIE, M.D. 66

Leukoplakia of Vocal Cords. By HERBERT TILLEY, F.R.C.S. 67

Case of Hypopharyngeal Carcinoma; Removal; Restoration of the Wall by turning in a Piece of Skin. By W. M. MOLLISON, M.C. 69

Plastic Operation for Nasal Stenosis. By W. STUART-LOW, F.R.C.S. 71

Nasopharyngeal Fibroma. By F. A. ROSE, F.R.C.S. 71

Plumbism and Pyorrhœa associated with Passive Œdema and Thickening of the Uvula, Epiglottis, and Arytænoids, with Enlargement of the Glands in the Parotid and Submaxillary Regions. By JOBSON HORNE, M.D. ... 72

Intense Dryness of the Mouth, associated with Ulceration of the Pharynx. By CECIL GRAHAM, F.R.C.S. 74

Chronic Syphilitic Laryngitis with Marked Stenosis. By WILLIAM HILL, M.D. 75

Lupus of the Mouth and Throat. By W. KENT HUGHES, M.B. 75

March 3, 1916.

The Histological Features of Rhinophyma (Epidiascopic Demonstration). By Sir WILLIAM MILLIGAN, M.D. 77

Two Cases of Removal of a Fish-bone from the Larynx in Adult Females. By Sir WILLIAM MILLIGAN, M.D. 79

Three Foreign Bodies removed from the Bronchi by Upper Bronchoscopy. By THOMAS GUTHRIE, F.R.C.S. 80

Large Naso-antral Polypus. By Sir WILLIAM MILLIGAN, M.D. 82

PAGE

A Note on Treatment of "Functional Aphonia" in Soldiers from the Front. By Sir **William Milligan**, M.D. 83

A Note on Treatment of Gunshot Injuries of the Larynx where "Webbing" of the Vocal Cords has taken place. By Sir **William Milligan**, M.D. ... 85

Radiogram showing an Epi-hyal Bone in a Human Subject. Shown by **Thomas Guthrie**, F.R.C.S. 87

Rapidly Growing Epithelioma of the Palate. By W. **Stuart-Low**, F.R.C.S. ... 87

Cases shown by **Coubro Potter**, F.R.C.S.Ed.

(1) Case of Aphonia in a Soldier 90

(2) Traumatic Injury to the Nose 92

(3) Bilateral Dacryocystitis in a Syphilitic Child 92

Rasps for the Per-nasal Frontal Sinus Operation. Exhibited by P. **Watson-Williams**, M.D. 93

Growth removed from Right Tonsillar Region. By J. W. **Bond**, M.D. (President) 94

April 7, 1916.

By E. D. D. **Davis**, F.R.C.S.

(1) Specimens from a Case of Laryngeal Crises with Abductor Paralysis (with Anatomic-Pathological Examination of the Nervous System by F. **Sano**, M.D.) 95

(2) Case of Laryngeal Stenosis, following a Bayonet Wound, treated by Intubation 101

Cases of Chronic Frontal Sinus Empyema treated by the Intranasal Method. By **Herbert Tilley**, F.R.C.S. 102

Paralysis of the Left Vocal Cord in a Woman, aged 25. By **James Donelan**, M.B. 108

By W. M. **Mollison**, M.C.

(1) Case of Achalasia of the Cardia cured by the Passage of a Gastric Tube kept in Position for Four Days 108

(2) Radiogram of the Œsophagus of a Case of Carcinoma which presented itself as an Achalasia 109

(3) Case of Tracheitis Sicca 109

Two Cases of Suppuration in the Antrum of Highmore associated with Uncommon Conditions. By W. **Jobson Horne**, M.D. 110

Intrinsic Cancer of the Larynx—Case to show certain Indications in regard to Laryngo-fissure and Complete Excision of the Larynx. By Sir **StClair Thomson**, M.D. 111

Epithelioma of the Palate. By W. **Stuart-Low**, F.R.C.S. 113

Case of Malignant Disease treated by Diathermy. By J. W. **Bond**, M.D. (President) 113

By Irwin Moore, M.B. PAGE

(1) Case of Retro-pharyngeal Abscess due to Breaking Down of a Tubercular Gland 114

(2) Case of Syphilitic Disease of the Larynx 117

Case of (?) Nervous or Functional Aphonia. By L. H. Pegler, M.D. ... 118

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

LONDON
JOHN BALE, SONS AND DANIELSSON, LTD.,
OXFORD HOUSE,
GREAT TITCHFIELD STREET, OXFORD STREET, W.

Laryngological Section.

President—Dr. J. W. Bond.

(*November* 5, 1915.)

Case of Bullet entering below Right Mastoid and emerging at Left Orbit.

By Major Perry Goldsmith, C.A.M.C. (Toronto).

Lance-Corporal S., aged 34. On April 3, at St. Julien, patient was standing with his back to the parapet when a bullet entered below the right mastoid and emerged at the inner angle of the left orbit. He was unconscious from April 23 to June 9. He has a hazy remembrance of having heard the nurse say "nothing was being done, as the man could not live." He gradually improved, however, and on August 30, before being sent back to Canada, he visited friends in the North of England. While there he suddenly developed left hemiplegia. He rapidly improved and entered Moore Barracks Hospital at Shorncliffe, where he came under my care. The notes made on October 9 are as follows: Small sinus at the inner canthus of left eye discharging pus. Complete right facial paralysis. Well-defined weakness of the left arm and leg, especially extensors and flexors, with wasting of muscles of left arm and leg. Sensory functions undisturbed. He is unable to balance himself on his feet and walks like a drunken man. Right ear quite deaf. Heart and lungs normal. Left arm—humerus fractured at the middle third on the same day as other injury; good union and good alignment. Bullet still in the triceps muscle.

Present condition: Facial paralysis unimproved. Deafness obstructive in type. Right middle turbinal and ethmoid partially destroyed. Right sphenoid contains muco-pus. Yellow pus high up in the right nostril, probably coming from frontal sinus, which I was unable to irrigate. Right antrum negative; pus in the left infundibulum; left antrum contains foul pus. I was unable to get into the left frontal sinus wound as the inner canthus has been closed for some weeks.

Ophthalmoscopic examination: Right eye—large retinal detachment, and practically blind; when he blows his nose he feels as if something moves behind the right eyeball. Left eye—vision badly impaired, due to large detachment. There is also sensory disturbance over the right cheek-bone.

In civil life this soldier was a physician practising in Ontario, and enlisted as a private in the First Canadian Contingent.

I should like to hear opinions as to the desirability of operating on the infected sinuses. I am not sure how intimately the intra-ocular metabolism is related to that of the accessory sinuses, but the work of Zimm shows it is very intimate. If the clearing out of the sinuses will lessen the liability to further retinal detachment later, I will do it, but I do not want to do anything which will make the condition worse; the man's condition is very pitiable already, as he is blind in one eye and has an extensive detachment of the retina in the other.

(*November* 5, 1915.)

Traumatic Paralysis of the Left Vocal Cord.

By Major PERRY GOLDSMITH, C.A.M.C. (Toronto).

CORPORAL T., 3rd Battalion, First Canadian Contingent, aged 32. Paralysis of left vocal cord, traumatic. Shrapnel wound in neck on April 22, followed by immediate loss of voice and spitting of blood; scar 2 in. external, and 1 in. above sterno-clavicular joint; was unconscious for about an hour and hoarse when he came to; forty-eight hours afterwards shrapnel was removed. Subsequently a great deal of muco-pus and blood expectorated. Voice very rough; a little talking tires it. The recurrent laryngeal nerve was severed rather low down. Before the war, such cases were rarely seen except after operations on the thyroid gland.

Laryngoscopic examination: Fixation of left vocal cord; right cord compensating by over-action. If the head is well thrown back and he drinks anything it causes spasms of coughing.

DISCUSSION.

Dr. WATSON-WILLIAMS: After a considerable experience of infected sphenoidal sinuses (and I have operated on several hundred patients), particularly cases in which the optic nerve tract has been distinctly involved, I should have no hesitation in opening the sinuses in the first case and establishing drainage. If this be supplemented by lavage and appropriate treatment, it promises improvement in the retinal condition and arrest of the sinus disease. I have never seen any untoward results from that course in regard to the visual or colour fields, and where these are contracted it often results in restoration to the normal.

Dr. DUNDAS GRANT: I hope that Major Goldsmith will bring to the Section a good deal of valuable material from the large hospital to which he is attached. I agree that the advice tendered by Dr. Watson-Williams is the wisest and safest for this patient. With regard to anastomosis of the facial nerve, there are fine descriptions of it in many books, but reports of end-results are very sparse. I would like to know from those who have seen the results of such anastomoses whether they have been satisfactory.

Dr. JOBSON HORNE: The question in the second case is as to whether anything can be done to improve the voice. Similar cases in men from the Front have come under my notice, and in the light of these I think that the region should be examined with the X-rays, to make sure there is no cause of pressure, such as the presence of a shrapnel splinter on the recurrent laryngeal nerve. If nothing is seen, I am opposed to any exploratory operation. Experience shows that in such cases time is a healer.

Mr. TILLEY: I agree with Dr. Horne. I have seen two cases of palsy of the recurrent nerve from neck wounds; apart from this lesion the patients are well. The wounds have healed, and the X-rays do not reveal any foreign body in the neck. My advice is to leave matters alone, because one does not know whether the nerve is cut or only bruised; in the latter event, time may show a recovery; and in such cases, even if the cord remain paralysed in the adducted position, the voice becomes quite good owing to a compensatory action of the other vocal cord.

Dr. PETERS: I desire to express my thanks to Major Goldsmith for having exhibited such an interesting set of cases. With regard to the patient with nasal trouble, in a somewhat similar case, but in which the bone was not so interfered with, I took out the middle of the nose and did a modified Roux's operation. The nose in this case was a very long one, and the procedure gave a very good result, enabling the nasal passages to be opened. With regard to Major Goldsmith's sinus case, it is extraordinary how the infection seems to have developed through the sphenoidal region and imitates to some extent the paralysis which is so common after cerebrospinal meningitis, though I do not know that the meningococcus is present in this case. The infection, probably streptococcal or by some other non-thrombosing coccus, has found its way through the sphenoidal region. There has been active mischief, and I recommend drainage. In the laryngeal case it is most difficult to know how much of the paralysis is due to shock and how much to actual nerve damage. In one case I saw, in which the paralysis was evidently due to shock, the cord had been in a position of abduction spasm, and the condition varied from day to day.

(*November* 5, 1915.)

Encapsulated Tumour removed from Region of Left Tonsil, Soft Palate, &c.

By J. W. BOND, M.D.

PATIENT, aged 60, was found by a dentist to have a growth at the back of his mouth. The fauces were two-thirds obstructed by a mass on the left, projecting from between the pillars of the fauces, upwards into nasopharynx, downwards to base of tongue, forwards to mid-line of ramus. The posterior border could not be reached behind, and, externally, it presented between the angle of jaw and the mastoid. As a whole it was smooth, hard in parts, with defined border, and slightly movable.

Operation five days later by exposing surface of growth in fauces, no splitting of cheek being found necessary. It seemed especially attached far back, internal to the mastoid process. A preliminary laryngotomy was performed.

The pathological report is of a roughly lobulated, encapsulated mass, weighing 51 grm., and measuring 6·5 cm. by 4·75 cm.: "On section it is composed of alveoli and strings of cells enclosed in a stroma of fibrous tissue, with myxomatous and cartilaginous areas. Its general structure is that of an endothelioma, such as would arise in the palate or in a salivary gland. We do not think it is strictly a tonsillar tumour."

(*November* 5, 1915.)

Tumour of Palate.

By GEORGE BADGEROW, F.R.C.S.

MALE, aged 38. The tumour has been slowly increasing in size; there is slight difficulty in swallowing and speaking. The swelling obscures the faucial arch and projects forward on the base of the tongue, lying more to the right of the middle line.

DISCUSSION.

The **PRESIDENT**: I regard Mr. Badgerow's case as an adenoma, and I think it can be readily removed by enucleation.

Dr. **DONELAN**: I reported a similar case to the Section several years ago Endotheliomata in that region, the so-called "potato tumours" of Jonathan Hutchinson, are supposed to originate from the carotid body, and might, as in this case, be present in the pharynx. I would like to know whether the President found anything in his dissection which supports that view. The reference to an attachment inside the mastoid would seem to show that it does not hold in all cases. In my own case the tumour had a more distinct relation to the carotid and, growing outwards, ultimately involved the skin. A general surgeon was consulted at an early stage, but as it even then involved all the great vessels it was considered inoperable.

Mr. **O'MALLEY**: I have recently seen two practically identical cases. The first was sent from France as a peritonsillar abscess, which had been opened on two or three occasions and nothing found in it. I enucleated the mass, which was absolutely encapsulated, between the mucous membrane at the front and the mucous membrane at the back, in the soft palate tissue. I had a section made of it, and one pathologist reported it as sarcoma; that was previous to my operation. Since then I have taken portions to two authorities, who regard it as adenoma. In the second case, I did not hesitate to attempt enucleation. It shelled out easily, and healed up as well as a wound could. Perhaps, under the circumstances, I shall not be able to see the patient long enough to know whether there will be a recurrence, but I do not anticipate such an event.

The **PRESIDENT** (in reply): I think the tumour I removed came from the base of the skull. With difficulty I reached the back of it from the mouth, and was able to remove it after stringing it with fishing line and pulling with gland forceps, twisting one way and the other, and also using a raspatory. For several weeks after the operation the patient complained much of giddiness when he stooped, but that has passed off, and he is now increasing in weight at the rate of 1 lb. per week.

Note by Mr. Badgerow.—Since reporting the above case I have removed the tumour from the palate by enucleation. There was considerable hæmorrhage. I will show the specimen at the next meeting.

(*November* 5, 1915.)

Intrinsic Cancer of the Larynx, One Year after Operation by Laryngo-fissure.

By Sir StClair Thomson, M.D.

This gentleman, aged 70, was shown to the Section on November 6, 1914, before operation,[1] and again on December 4, 1914, after the operation of laryngo-fissure on November 12.

It will be remembered that doubt was thrown on the diagnosis by some members at the first meeting, as the cord was mobile and no portion had been examined under the microscope. A section of the growth removed at the operation was shown before the Section on February 5, 1915, and was reported on by Professor Shattock to be an early squamous-celled carcinoma. It will also be remembered that the microscopic examination of the growth removed by laryngo-fissure on November 12 suggested that the growth had spread right up to the line of excision in the posterior subglottic region. A second laryngo-fissure was therefore performed on November 20, and the patient was shown to the Section a fortnight later.

The case is shown for the following reasons:—

(1) The diagnosis was made in the absence of any microscopic report and in a case where the cord preserved its mobility.

(2) Although the patient had reached the age of three-score years and ten, he was able to support two operations for laryngo-fissure within ten days of one another.

(3) He has passed the first—i.e., the important—year of probation without any suspicion of recurrence.

(4) He has a good strong voice and enjoys excellent health.

DISCUSSION.

The President: It seems to be a very successful case; on the whole, one expects these cases to be successful, as the operation performed has become a regular and standard one, and that fact does credit to the past Presidents of the Section. To me the particular case is not so interesting as the difficulties of operation, and I would like to know from Sir StClair Thomson what he finds to be the chief difficulties. My own difficulty consists chiefly in seeing properly the area of operation.

---

[1] Vide *Proceedings*, 1914, viii, p. 23.

Mr. HERBERT TILLEY: I note the words "He has passed the first—i.e., the important—year of probation without any suspicion of recurrence." I think one should be very careful in these cases, because there is a feeling abroad that if there be no recurrence in the first year, one is warranted in speaking of the case as cured. Here is a photograph of a recurrence nine years after the primary operation, this recurrence causing death from re-growth in the other cord ending in sudden suffocation. I have had another patient, originally under the care of Sir Felix Semon, who suffered from recurrence thirteen years after removal of carcinoma. Two months ago I saw a third case on whom I operated seven years ago; he came because his voice was not so good, and a recurrence of typical epithelioma was seen, for which half the larynx was removed. Last week I saw a fourth case, which was shown at this Section two years ago, and there is now a granular-looking recurrence. The time has come for revision of the view that absence of recurrence for a year is tantamount to cure. With regard to the operation, my custom is to use a strong headlight, which overcomes all the difficulty of which the President has spoken.

Dr. JOBSON HORNE: As one who threw doubt on the diagnosis of the case when it was first shown to the Section I still feel, from a clinical point of view, that it must have been a very early case indeed of epithelioma. The early diagnosis strengthens, of course, a favourable prognosis. With regard to the control of hæmorrhage and the movement of the parts during the operation, some years ago I adopted the use of cocaine. A pledget of cotton wool soaked with a 10 per cent. solution of cocaine is placed within the larynx immediately after the thyroid cartilage has been opened. That causes much blanching of the area of operation, but bleeding from a small vessel in the arytænoid region at times gives trouble. Cocaine, in my opinion, is preferable to adrenalin.

Dr. DUNDAS GRANT: I think it important, in order to get a good view, to make a clean section between the vocal cords, at the anterior part of the larynx. I have seen a very experienced surgeon get only a confused and difficult view after opening the thyroid from without. I make the incision from within outwards, passing the bistoury from the thyroid notch inwards and downwards, afterwards cutting outwards. That cannot be done very well if the cartilages are already ossified, but much the same effect is produced by using Waggett's forceps for splitting the thyroid. The occurrence of hæmorrhage is another difficulty, this taking place after the cutting away of the cord; I have used the galvano-cautery in these cases, or even the Paquelin, and that seems to be excellent also in preventing recurrence, its use is strongly insisted on by many American operators. The only objection to the cautery seems to be that the voice is not quite so good afterwards as if it had not been used. We feel indebted to the exhibitor for having had the coolness to do a second operation; it was much better than anxiously waiting to see what would happen. We should be prepared to follow the same course when faced with the difficulties described by Sir StClair Thomson.

The PRESIDENT: I think some of the cases of recurrence are really due to inoculation of diseased cells. It is well known that these cells cannot live outside the body.

Sir STCLAIR THOMSON (in reply): I cut off the patient's tobacco and alcohol for a week before the operation, have the mouth purified, and any tooth-stumps extracted. I am also very particular whom I have as anæsthetist, so that there is no risk of air-starvation. An hour before operation I inject the skin with eudrenine, which renders the area practically bloodless until the trachea is reached. Then I stab the trachea with a hypodermic syringe containing 15 drops of 2½ per cent. cocaine. That makes a tracheotomy as peaceful a performance as opening a mastoid. After this stabbing of the trachea, I wait ten minutes; then the sudden rush of air which follows the introduction of the tracheotomy cannula does not cause the reflex cough which so often splashes the operator and surroundings. After splitting the larynx I put in a pledget of wool soaked with cocaine and adrenalin. The removal of the growth is done by submucous resection. I try to raise the vocal cord with its tumour by dissecting up the perichondrium, so as to leave the inner surface of the thyroid cartilage bare. Years ago, before submucous resection came in, hæmorrhage was a great trouble, but that does not now come on until the undermined growth is removed. Then I divide above and below, leaving the worst until the last, namely, separation round the arytænoid. Here there are many muscles and attachments, and a little vessel which sometimes spouts; that can be pinched for a short time with pressure forceps. I agree as to the difficulty of seeing properly in these cases; quite apart from the light, one only gets an oblique view, and the thyroid wings cannot be forcibly separated. I have tried to overcome that difficulty by semi-dislocating the larynx on the spinal column. With regard to recurrences, I think our views may be summed up by saying that if a case comes back with disease within a year, it is incomplete removal; if it comes back after that time, it is recurrence. It is the first year which is the anxious time, and especially the first three months. Recurrences at the long periods mentioned by Mr. Tilley are a matter which the Imperial Cancer Research might well take up, because the recurrence of disease is not always at the original area. I have had a case in which the recurrence was at the base of the tongue on the opposite side; yet there is but little direct lymphatic connexion between the two sites, namely, the right cord and the opposite lingual tonsil. This morning I suffered one of my disappointments—with a patient on whom I did laryngo-fissure followed by a complete laryngectomy six years ago. It was one of my show cases; the patient wore a von Bruns' instrument, and spoke well. Now there is a very hard gland attached to the carotid, and I feel sure it is malignant; yet there has been no recurrence in his throat meanwhile. I agree with Dr. Grant's remarks as to cutting from within outwards. If there is ossification, I use a saw, or Waggett's shears, which have been considerably improved by Dr. Irwin Moore.

(*November* 5, 1915.)

Case of Congenital Fistula of the Nose.

By HUNTER TOD, F.R.C.S.

MALE adult. At birth a small opening was noticed at the lower part of the bridge of the nose. As long as the patient can remember, a slight secretion could be squeezed out on pressure. During the last two or three years an inflammatory swelling has occurred intermittently over the bridge of the nose which appears to be due to retention of the secretion. Opinions are invited with regard to treatment.

DISCUSSION.

Dr. KELSON: I have had two similar cases: one a girl, whom I showed in 1904, whose photograph I now exhibit. Both the cases were very obstinate, and both were operated upon several times. One finally healed, but the other disappeared from my view. I expect Mr. Tod will find some difficulty in this case. Fortunately his patient is a man, to whom the question of after-appearance is not so vital as to a female.

Mr. ROSE: I have had one such case. Before I saw the patient for the first time, the external opening had been closed by a previous operation. A cyst had formed, converting the end of the nose into what looked like a red cherry. On opening the cyst, pus and clear glairy fluid exuded. The pressure of the cyst had caused absorption of part of the nasal bones and a considerable area of the triangular cartilage. I tried several times to destroy the lining of the cyst: it could not be dissected out without removing a considerable part of the external skin of the nose. It was scraped on several occasions and various caustics were applied, but when the opening was allowed to close the swelling returned and burst or had to be opened. The most recent efforts have taken the form of electrical treatment—rather powerful ionization. Recently I heard that the fistula is now closed and that there is no sign of recurrence. To rely upon scraping is, in my experience, unfavourable.

Mr. HUNTER TOD (in reply): I brought the case because I foresaw difficulties. I consider this is a true congenital cyst of the nose, owing to lack of fusion of the globular processes with the fronto-nasal process. The patient complained bitterly because his nose swelled up at intervals and was unsightly. I told him that operation probably would be successful, but might be a failure, and therefore he should himself decide whether he would submit to it or not. I am indebted to Mr. Rose for his opinion.

(*November* 5, 1915.)

Malignant Papillomatous Growth of Left Inferior Turbinate and Ethmoidal Region.

By HUNTER TOD, F.R.C.S.

MRS. L., aged 62, was first seen in January, 1911, complaining of left nasal obstruction and epistaxis. On examination, the left side of the nose was found to be occupied by a soft, papillomatous growth, attached by a broad base to the inferior turbinate. The growth was removed, but recurred in three months. It was then removed again. Microscopical examination of portions of the growth on each occasion proved it to be a proliferating papilloma.

In December, 1911,[1] the patient was shown to this Section by Mr. E. W. Bain, who at the time was my senior clinical assistant at the London Hospital. There was an interesting discussion with regard to the nature of the growth, it being considered of rare occurrence. A portion of the growth was then sent to the Morbid Growths Committee, who subsequently reported as follows: "All agree that it shows the structure of an innocent papilloma."

Shortly afterwards the patient ceased attending the hospital, and only returned in October, 1914, complaining of pain over the left side of the face. Intranasal examination showed the left side to be filled with the growth, which appeared more friable and hæmorrhagic than when seen two years previously. There was also much purulent discharge. The antrum was dark on transillumination and was punctured through the inferior meatus of the nose. A small quantity of pus was washed out. A portion of the growth was removed and sent to the pathologist for microscopical examination. His report was "papillary columnar and polygonal-celled carcinoma of mucosa of inferior turbinate."

The patient was admitted into the hospital and operated upon on October 29, 1914. The external carotid was first tied in the neck. An incision was made from the level of the inner canthus of the left eye and continued downwards along the junction of nose and cheek, curving round the ala nasi until it entered the lower margin of the nostril. On the soft parts being retracted and well separated, a clear view of the interior of the nose could be obtained. The anterior alveolar and nasal portion of the superior maxilla was removed, exposing the growth, which could be seen to have pushed the nasal wall of the antrum outwards, so that the antrum itself was quite a small cavity and was filled with pus. An attempt was made to shell out the growth, but it was too friable and had to be removed piecemeal. The whole of the antro-nasal wall, including the inferior turbinate and ethmoidal region, was completely removed and the sphenoidal cavity curetted. At the end of the operation the interior of the nose appeared as a large smooth cavity. Owing to the tying of the external carotid, there was very little bleeding. The external wound was sutured and the nasal cavity plugged with strips of gauze smeared with sterilized oil, which were removed two days later. The patient made an uninterrupted recovery.

---

[1] *Proceedings*, 1912, v, p. 53.

In March, 1915, some granulations appeared in the sphenoidal and post-ethmoidal regions. A microscopical section of a portion removed showed "solid trabecular columnar and polygonal-celled carcinoma of the mucosa." The patient was admitted to the hospital. The area of growth was removed by means of curetting and punch forceps. A tube of radium was then applied directly to this area and left within the nose for twenty-four hours.

On October 5, 1915 (one month ago), a few granulations appeared at the margin of the sphenoidal opening. As a precautionary measure, a tube of radium was again applied locally for twelve hours and the granulations subsequently disappeared. The nasal cavity now appears quite free from growth, the only inconvenience being that owing to the size of the cavity it becomes lined with crusts if the patient is at all neglectful with regard to keeping it thoroughly clean. Microscopic sections are shown.

DISCUSSION.

The PRESIDENT: Here again the question of recurrence due to inoculation occurs. The result seems to be very good.

Mr. ROSE: I regard the specimen as of unusual interest, and I am glad it has been brought forward. I have had two similar cases but have lost sight of them. A recurrence occurred in each case, and the growth was removed, and as long as the patients were kept under observation there was no further recurrence. If anything further happens in this case I hope Mr. Tod will report it.

Dr. PEGLER: The original specimen shown by Mr. Bain is now in the Museum of the Royal College of Surgeons, and is highly interesting as an example of what was then considered to be an unusually large nasal papilloma. A microscopic section of it is in the cabinet, and I hope Mr. Tod will forward a section of the present growth, which, if malignant, makes a comparison of the two a point of special interest.

Mr. HUNTER TOD (in reply): Since the case was put on the agenda, Dr. Turnbull, Pathologist at the London Hospital, has again examined the section very carefully, and is not now so certain that the case is a true carcinoma. He now reports as follows: "The specimens show a villous, fibro-epithelial, transitional-celled growth. The proof of malignancy in such a growth depends upon invasion of the subjacent tissues by the epithelium; of this there is no evidence except in one spot in specimen 1. The formation of atypical cells in the epithelium is, however, so frequently the precursor or accompaniment of invasion that the appearances in specimens 1 and 3 justify, I think, a diagnosis of malignant tendency." Though the diagnosis was that the growth was of malignant tendency, I think the operation which has been performed is the correct one. I should like the Morbid Growths Committee to express an opinion about the growth, as I regard it as an important case.

(*November 5*, 1915.)

Case of Chronic Suppuration of the Left Frontal, Ethmoidal and Maxillary Sinuses.

By J. L. IRWIN MOORE, M.B.

THIS case, a female, now aged 54, was shown at the Section meeting on May 5, 1911,[1] to illustrate the satisfactory results of a complete Killian operation on the left frontal sinus. An intranasal operation had also been performed at the same time on the left maxillary antrum. Previously to the operation patient had suffered for eight years from severe pain over the left frontal sinus shooting down the face and neck, with constant discharge of pus from the left naris. She used six handkerchiefs a day.

When operated upon in March, 1911, the left frontal sinus was full of pus and degenerated mucous membrane. A complete Killian operation was performed, and it was necessary to remove the roof of the orbit in order to obliterate the sinus. The ethmoid cells, which were extensively diseased, were removed together with many polypi and much degenerated mucosa from the left maxillary antrum.

---

[1] *Proceedings*, 1911, iv, p. 124.

When shown in May, 1911, the left frontal sinus was completely obliterated, there had been no nasal discharge since the operation, all headache had disappeared, and the patient's health had greatly improved.

Patient is now suffering from atrophic rhinitis of the left nasal fossa with great pain over the left maxillary antrum extending to the ear and side of neck. Three months after operation the left nasal fossa again began to secrete pus in considerable quantity, which appeared to come from the maxillary antrum. A Caldwell-Luc operation was therefore performed on this left antrum and some unhealthy polypoid mucosa removed. Improvement followed for six months till June, 1912, when the discharge of pus again became considerable, accompanied by crusts. The pain over the cheek became more severe. Examination of the pus showed the presence of the Friedländer bacillus. Two months' treatment by vaccine diminished both the discharge and pain for six months, patient at this time using only one handkerchief a day.

In January, 1913, discharge again increased and became more in character like that of an atrophic case, with fishy smell, accompanied by exacerbations of pain. Vaccine treatment for six months again resulted in great improvement, there being scarcely any discharge, the patient "hardly knowing what it was to use a handkerchief."

In consequence of intense infra-orbital neuralgia from June to October, 1913, the left maxillary antrum was reopened through the canine fossa, and the bony canal surrounding the infra-orbital nerve was partially removed, with great relief of pain.

From January to June, 1914, discharge again increased. A three months' course of vaccine gave no result. Since this date the discharge and pain have continued with only slight variation from day to day, and no treatment gives any relief.

Although troubled with this atrophic condition and severe pain, patient's health is much better than when first seen in 1911.

Any suggestions as to treatment would be most acceptable.

DISCUSSION.

Mr. TILLEY: I have had one or two cases of sinus suppuration in which the radical operations were performed and the sinuses cured, but afterwards the patients had typical atrophic rhinitis with crusts. I cannot explain the reason for this. If Dr. Moore can cure the headache accompanying atrophic rhinitis—a very common symptom—he will earn my thanks.

Mr. O'MALLEY: I recently operated upon a case in which the antrum had previously been opened and had closed. Though the opening is now patent, the patient still complains of pain in the cheek. There is nothing the matter with the frontal sinus in this case, and I wondered what was the explanation. I have looked up a dry skull, and have seen that an ethmoidal cell passed as far out as the infra-orbital canal, and there seems no reason why structures in that canal should not be involved, just as sphenoidal sinus disease involves the optic nerve. In doing an extensive frontal sinus operation it is very difficult to approach that region unless one proceeds upwards from the antrum under the floor of the orbit. I do not think the recurrence in Dr. Moore's case can be due to atrophic rhinitis, which is a continuous and not an intermittent affection, and there is probably a cell under the floor of the orbit which from time to time causes these recurrences, implicating the infra-orbital nerve.

Dr. PEGLER: In agreement with Mr. O'Malley I consider it is a mistake to call this condition "atrophic rhinitis," the true pathology of which is so little known. These traumatic cases should be distinguished from those of idiopathic disease. Few authorities would agree that the local pain is due to neuritis, but most will have found that the headache in all atrophic conditions can be much relieved by careful lavage.

Dr. DAN MCKENZIE: In my experience, cases of the kind are not uncommon; there is a drying up in the process of getting well, and what is called atrophic rhinitis occurs. If Dr. Moore were to leave this case alone without further treatment I think it would recover. There comes a time in such cases when, as far as intranasal operating is concerned, discretion is the better part of valour. The pain I consider to be due to neuritis, which will also disappear in time.

Dr. MOORE: I consider that the condition is due to atrophic rhinitis. I cannot find any ethmoidal cells to account for the discharge, for they were thoroughly removed at the time of the original operation. There is no doubt that the frontal sinus cannot account for it, for this was completely obliterated. No sphenoidal sinus can be found; this was apparently obliterated at the same time as the ethmoidal cells. The patient washes out her nose daily, but is much troubled at times with large atrophic crusts in the post-nasal space. She is anxious to be relieved of this, also of the pain. I ask for suggestions as to further treatment.

(*November* 5, 1915.)

A Nasopharyngeal Polypus (Choanal Polypus) originating in the Right Maxillary Antrum.

By J. L. IRWIN MOORE, M.B.

THE patient, a male, aged 42, was shown at the meeting on May 7, 1915. He had a growth in the right maxillary antrum extending through the middle meatus into the nasopharynx, where a dependent portion could be seen. Following the introduction of the radium emanation tube on April 20 into the maxillary antrum, the swelling over the outer antral wall, which involved a portion of the soft parts, gradually subsided. A fœtid purulent discharge followed from the naris and the opening in the canine fossa.

On June 15 patient complained of a recurrence—dating from the previous five days—of the brawny swelling over the right maxillary antrum, accompanied by marked œdema of the right lower eyelid.

On June 24 under chloroform, an attempt was made to pass a wire snare through the right naris in order to encircle the post-nasal dependent portion of the growth, with a view to evulsion. From a post-rhinoscopic examination this appeared to be quite simple, but was found to be impossible on account of the growth obstructing the choana and being firmly attached to the choanal margin. No forceps would pass along the naris past the growth, the aperture only admitting instruments the size of the snare tube. With the patient's head in the dependent position, the protruding post-nasal extension of the growth was removed piecemeal through the mouth by means of Luc's forceps, guided by the index-finger of the left hand in the nasopharynx. This portion of the growth was of a hard consistence and firmly attached to the choanal margin and the spheno-ethmoidal recess, and it had absorbed a portion of the posterior edge of the vomer. The removal of the intranasal portion of the growth was carried out in a similar way by the forceps. The opening into the maxillary antrum through the canine fossa was next enlarged, and the antral portion of the growth, which filled nearly the entire cavity, was found to be soft and necrosed. This was removed, together with the antro-nasal wall, which had been partially absorbed by the growth. The turbinals and ethmoidal cells had also been absorbed, so that the operation converted the left nasal fossa into one large cavity. There was no post-operative hæmorrhage and no packing was required. The patient made a speedy recovery and left the hospital in a week.

This case is interesting in that:—

(1) It confirms the view that the maxillary antrum may be the seat of origin of these nasopharyngeal polypi (choanal polypi).

(2) It shows that these polypi are subject to inflammatory changes, and may cause extensive adhesions and absorption of bone—e.g., in this case there were found necrosis and absorption of portions of the outer antral wall involving skin of the cheek, nasal wall, sphenoidal sinus, ethmoidal cells, and vomer.

(3) The rapid removal of such a growth with the forceps makes the bleeding negligible.

(4) The dependent position of the head does away with the danger and risk of blood being drawn into the larynx, and hence avoids the necessity of a preliminary tracheotomy.

(5) The growth could not have been removed *en masse* by evulsion with forceps or snare. By these three routes it was possible to remove piecemeal the whole of a very extensive growth, so that more formidable procedures—e.g., Moure's or Rouge's external operations—were unnecessary.

The skiagrams by Dr. Finzi show both maxillary antra to be somewhat opaque, the right more so than the left. This is well seen in the oblique views. The right sphenoidal sinus is very opaque, and also the ethmoidal cells on the right side.

The photograph of patient taken before operation shows the marked swelling over the right maxillary antrum.

Microscopic sections of the growth are shown.

REPORT BY PROFESSOR SHATTOCK.

(A) From the Maxillary Antrum.—The pedicle: This consists of loose connective tissue, of an open feltwork of slightly wavy fibrils, fairly well provided with proper cells. That the material is not a mere coagulum appears from the fact that the fibrils are arranged more or less in intersecting bundles, and so present the usual differences according as the bundles are divided longitudinally or transversely, and the cells exhibit corresponding variations in form. The vessels are comparatively few and of inconsiderable size; the hyaline condition of their walls may be ascribed to the imbibition of fluid, the open character of the fibrous tissue being indicative of an œdematous infiltration.

(B) From the Nasal Cavity.—This exhibits the typical structure of a soft fibroma, and consists of loosely arranged wavy fibres, amongst which there is a fair abundance of proper lamellar cells. The investing epithelium is in places intact.

(C) From the Nasopharynx.—This portion of the tumour consists of a particularly open feltwork of very delicate fibres arising from coarser strands of connective tissue, the appearances being attributable to œdema of a connective tissue basis, arising probably from pressure constriction. The proper lamellar cells are relatively few, but their nuclei are well stained. Polymorphonuclear leucocytes and plasma cells occur in the meshes. The vessels are filled with normal blood; here and there the tissue is necrotic.[1] The investing epithelium is in places intact. The histological diagnosis of the neoplasm is a soft fibroma in which œdema has occurred.

The PRESIDENT: I consider that in many of these cases there is no necessity to think of doing a laryngotomy or tracheotomy. It is unusual for these growths to involve the skin of the cheek. I have never seen a choanal polypus do so; such involvement is seen oftener in the case of sarcoma.

(*November* 5, 1915.)

Final Notes on a Case of Malignant Stricture of the Œsophagus, situated ¾ in. above the Sternal Notch.

By J. L. IRWIN MOORE, M.B.

SHOWN at the Section meetings on November 6, 1914, and May 7, 1915, to illustrate the benefits of Dr. William Hill's styletted oro-œsophago-gastric feeding tube.

The patient was so comfortable with the tube that he could not be persuaded to return and have a new one inserted. A few days after the last report on the case the tube became blocked, and all attempts to unblock it failed; it was therefore removed. The rubber was found to have perished, the tube had been flattened by the pressure of the growth, and the wire stylet broken and corroded. Three days later the patient came to town, but it was found impossible to insert another tube through the stricture, nor could even the smallest bougie be passed. Gastrostomy was therefore performed two days later, but the patient only survived eighteen days.

---

[1] In the necrotic tissue specially prepared sections show the presence of short streptococci and fusiform Gram-negative bacilli (Dr. Eastes' Laboratory of Pathology and Public Health).

This case is interesting in showing that:—

(1) A patient suffering from malignant stricture of the œsophagus, which would only admit a small catheter, may be kept alive for eight months and satisfactorily fed on semi-solid foods, *per vias naturales*, by means of this tube passed through the stricture with the aid of the œsophagoscope. The loss of weight was slow, being only 1 st. 8 lb. during the eight months, compared with 2 st. 9 lb. during the two months preceding the intubation.

(2) The operation of gastrostomy, which would otherwise have been necessary when the patient was first seen in September, 1914, was postponed for eight months, during which time he was able to lead a cheerful life, enjoy his food, attend to his business as a traveller, and lay by some money for his family.

(3) As Dr. Hill points out, the tube has a gradual mechanical dilating effect on a stricture. In this case, after insertion for a few days, the patient was able to swallow liquids and even semi-solid foods alongside the tube. After the tube had been inserted for seven weeks and then removed, he was able to swallow food without any tube for nine days. Again, the copious secretion of saliva and mucus, which causes such distress to the patient in these cases, was greatly reduced and relieved by this method of intubation.

(4) The tube should not be left *in situ* too long before a fresh one is inserted. A change every three months appears to be advisable.

(*November* 5, 1915.)

Bullet Wounds of Face and Neck.

By W. Stuart-Low, F.R.C.S.

Case I.—A soldier who was wounded on June 1, 1915, at the Battle of Ypres, by a bullet which entered over the right side of the nasal bridge, passing through the right maxillary antrum, the roof of the mouth, the tongue and the left ramus of the lower jaw, and out at the left side of the larynx. The jaw was fractured, and having been very skilfully wired by Dr. James, has united firmly. The right antrum was quite dark on transillumination for some weeks, no doubt due to a blood-clot, but it is now clearer.

Case II.—A soldier wounded in Flanders by a bullet which entered on the right side of the neck and passed out on the left side. It must have injured the larynx, as he now has a web occupying nearly half the glottis and greatly impairing his respiration and vocalization. An expression of opinion as to the best method of removing this membrane is desired.

Notes of the Case.—While kneeling and firing in a trench during a charge he felt a sudden pain in the right side of his neck, which he at first thought was nothing but a blow from a flying piece of earth or stone. Shortly after, he felt the blood trickling down the neck, and found that he was speechless, being unable to reply to the questions asked by his corporal. Stretcher bearers found him and applied a first-aid dressing, and he was able to walk back about four miles to the casualty station, where his wound was more carefully examined. The bullet wound of entrance was found to be in the neck about 2½ in. below the right ear, passing through just anterior to the border of the sterno-mastoid muscle probably through the larynx, and emerging from the neck on the other side at a slightly lower level. At the casualty station he was inoculated with anti-tetanic serum soon after admission, but on the second day it was necessary to perform a tracheotomy. He was kept in the hospital in France for about a month, and then sent over to Fort Pitt Military Hospital. Shortly before leaving France the tracheotomy tube was removed. He was admitted at the Central London Throat, Nose, and Ear Hospital on October 19, 1915.

DISCUSSION.

The PRESIDENT : I consider that these are extremely difficult cases, and that some operation will be needed. My choice would be laryngo-fissure.

Dr. PETERS : I think the second case should be left alone. Probably the web will thin out considerably, and if, later, removal become necessary, it will then be a simple matter.

Dr. DAN MCKENZIE : I think diathermy will get rid of the web.

(*November* 5, 1915.)

Paralysis of Left Vocal Cord from Bullet Wound of Neck.

By DAN MCKENZIE, M.D.

THE patient, an officer, received his wound in May of this year in Gallipoli. Immediately after receiving it he became aware that he could only speak in a whisper. The wound healed up in three weeks and the voice has returned, so that he can now converse comfortably, although shouting soon tires it. Laryngoscopy shows the left cord to be paralysed.

There are two questions of interest in the case :—

First, the cause of the paralysis. The bullet (from a rifle) entered the neck in the middle line behind, opposite the fourth cervical vertebra (as nearly as I can make out), and emerged in front at the anterior border of the sternomastoid, at a spot midway between the upper edge of the thyroid cartilage and the hyoid bone. At this level obviously it must have been the left vagus itself which was severed, and that without any apparent injury either to the carotid vessels, to the internal jugular vein, or to the sympathetic cord. The pulse is normal in rate and rhythm.

The second question was put to me by the patient. He is a barrister in civil life, and he is anxious to know whether, when he returns to it, he will be able to use his voice in court. In other words, what is the prognosis as regards the strength of the voice after the onset of paralysis of one vocal cord ?

It has been proposed that the vagus should be cut down upon and re-united.

The PRESIDENT: I think an exploratory operation is needed in order to see if the vagus has been cut across. Where there is possibly only bruising and suspension of function, perhaps for a long time, that is the first course to think of before deciding on further measures.

(*November* 5, 1915.)

Bullet Wound of Face.

By ANDREW WYLIE, M.D.

PATIENT was injured by a bullet which entered near the outer angle of the eye and made its exit by tearing through the right nasal bone, leaving a large opening. Several operations were performed to close this opening without success. I cut the middle turbinal at the posterior end and pushed it upwards into the opening, leaving a small part attached. The outside was covered by a skin-graft from the arm. This plan proved a complete success.

(*November* 5, 1915.)

Shrapnel Wound of Nose and Cheek.

By L. H. PEGLER, M.D.

THE patient is a soldier, aged 20, who received the injury last June. The fragment passed across the face from behind forwards, throwing down a flap of tissue below the right lower eyelid and passing through the nose, carrying away much of the central part. Plastic operations have been performed at a provincial military hospital. The sight of the right eye is lost. Both ears were suppurating when the patient came to London; this has now ceased. The right nasal fossa is obstructed, but the patient refuses any operation.

DISCUSSION.

The PRESIDENT: I think improvement can be brought about by forcible dilatation under an anæsthetic and making some cuts, a plug being passed daily, as has been done in some cases of congenital syphilis.

Dr. PEGLER: Two or three plastic operations have been done by the surgeons at Netley, a flap having been turned in from the cheek, but the patient now pleads that he is tired of operations, and positively refuses even the restoration of free nasal breathing, which I was anxious to give him, and for which purpose he has been sent to hospital.

(*November* 5, 1915.)

Disease (Empyema) of Right Frontal Sinus.

By L. H. PEGLER, M.D.

THE patient is a soldier, aged 20, with suppuration of anterior ethmoidal cells and frontal sinus on the right side of twelve months' duration. This had been rendered latent by an extreme vomerine deflection of the septum, so that the disease was not diagnosed till submucous resection had been performed, though some discharge had been noticed by the patient. The pain complained of lay around and over the right eye, but the principal subjective symptom was giddiness. Patient is subject to fainting fits on slight provocation. Irrigation of the right frontal sinus brings away a formed mass of purulent material corresponding with the size of the space. In the skiagram exhibited the right frontal and maxillary sinuses are both dark, but no pus has been found in the maxillary sinus upon two explorations.

The PRESIDENT: I should be inclined to make a larger opening into the frontal sinus, and with washing out and drainage improvement ought to follow.

Postscript by Exhibitor.—The fronto-nasal canal has since exhibition, been enlarged by Dr. P. Watson-Williams's method, and the patient has thereby been enabled to wash out his sinus himself with corresponding benefit, though some discharge continues.

(*November* 5, 1915.)

Cases illustrating Results obtained by Use of Simpson Light.

By W. DOUGLAS HARMER, M.C.

(*a*) *Lupus of Face and Hard Palate; Tuberculous Disease of Foot.*—The disease commenced about seven years ago, when patches appeared on the face. The palate became affected three years later, and the disease in the foot appeared in May, 1915. Nasal passages also involved. Five operations on the face were performed at Guy's Hospital, and the patient had X-ray treatment at St. Bartholomew's Hospital for about three months. Simpson light treatment from June to October, 1915 (forty-four applications). The patches on the face and the disease in the foot are both much improved.

(*b*) *Lupus of Anterior Nares.*—The disease started about five and a half years ago, when the patient was treated at St. Thomas's Hospital and temporarily cured. In September, 1913, the inflammation recurred and she came to St. Bartholomew's Hospital, where she was treated with Finsen light and iodine ionization for three months with some improvement, which was maintained until this year. As the inflammation had never entirely disappeared she was given Simpson light (sixteen applications) from May to August, 1915, and improved rapidly under the treatment.

(*c*) *Rodent Ulcer of Nose and Face.*—The ulceration was said to be of five years' duration, during which time the patient had been under treatment at the London Hospital. A large part of the face had been destroyed, and the cavity was lined with a nodular growth, with much purulent secretion. Simpson light treatment (forty-four applications) from June to October, 1915. The ulceration has steadily decreased, and the present condition shows remarkable improvement.

(*d*) *Nasal Polypi and Asthma.*—For five years subject to attacks of asthma more or less constantly. Recently severe nasal catarrh and obstruction. Polypi removed from the nose in 1913 and 1914. In spite of general medical treatment by Dr. H. W. P. Young, including vaccines, the attacks of asthma became more frequent and more severe, and his general condition deteriorated. Simpson light (forty-four applications) from June to October, 1915. Now seems distinctly better in every respect, and for six weeks has had very little asthma.

DISCUSSION.

Mr. DOUGLAS HARMER: At St. Bartholomew's Hospital the lamp has been in use for six months in the treatment of many superficial lesions of a septic nature, also in a case of rodent ulcer and in one of asthma. With regard to other catarrhal conditions and sinusitis, the results with the lamp have been indefinite, and at present it is too early to say anything. Of course, six months is not long enough time in which to form a judgment, but I felt that I would like to bring the matter forward before going away.

Dr. E. P. CUMBERBATCH: During the past few months I have had experience in the application of the Simpson light at the Electrical Department of St. Bartholomew's Hospital. I would mention three cases: one of eczema, one of lupus, and a third of rodent ulcer on the lower eyelid. With regard to the nature of the rays given off by the Simpson lamp, the light is composed of luminous rays ranging from red to violet in the spectrum, and, in addition, ultra-violet rays. In the present state of knowledge of physics, it does not suffice to say a lamp gives off ultra-violet rays; one must say what is the wave-length of those rays. Ultra-violet rays are produced between electrodes of carbon, and have been employed, in the Finsen lamp, for the treatment of lupus. In the Simpson light the ultra-violet rays are produced from an arc between electrodes of wolfram, and these ultra-violet rays are much larger in amount than those formed between ordinary carbon electrodes, and investigation has shown that these are of shorter wave-length than those produced by a carbon arc lamp. It may be supposed that it is superfluous to mention the wave-length of the ultra-violet rays, but it is not so, for it is found that the rays which are formed between silver electrodes have a selective action in destroying the *Bacillus coli*, but not the *Bacillus typhosus*. The rays from other arc lamps do not possess the same power. Hence, in making cultures from suspected stools, it is possible to use ultra-violet rays from the silver arc lamp to destroy the *Bacillus coli*, which rays will exercise no action on *Bacillus typhosus*. The explanation of difference in action must be sought in the difference of the wave-length.

Laryngological Section.

President—Dr. J. W. BOND.

(*December* 3, 1915.)

The Histology of an Angeio-fibroma of the Nasopharynx and its important Bearing on Operative Procedures.

By IRWIN MOORE, M.B.

I HAVE the pleasure of now showing you on the screen, by means of the epidiascope, the microscopical sections from the case I exhibited on March 5 and May 7.[1]

Considerable difference in opinion appears to exist as to the origin and attachments of these growths, the question of a capsule, the position of the blood-vessels and sinuses, and the best method of removal. Further confusion takes place through not differentiating them from fibrous growths originating in the nasal cavities.

I think the sections shown to-day will help to clear up some of the points which have been recently discussed, and assist us in coming to a satisfactory conclusion.

THE GENERAL STRUCTURE OF THESE GROWTHS.

They are composed mainly of a dense white fibrous tissue, strands of which may be seen spreading out from their basal origin. A longitudinal section microscopically shows these fibres displayed parallel with each other, with a tendency to interlace. Scattered about and embedded between the fibres are a variable number of connective tissue cells, in some parts densely packed.

---

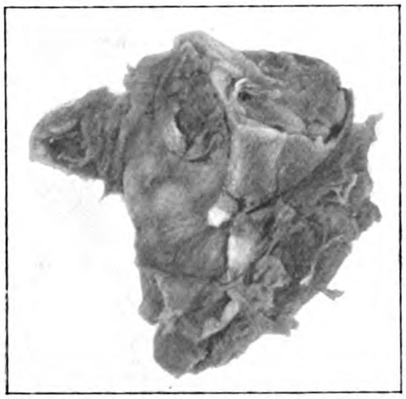
[1] *Vide Proceedings*, 1915, viii (Laryng. Sect.), pp. 98 and 103.

Figs. 1 and 2 are photographs showing the fibrous stroma very rich in connective tissue cells.

These growths also contain a large number of thin-walled blood-vessels and large cavernous sinuses.

SEAT OF ORIGIN.

They arise from a broad base in the thick periosteum covered by mucous membrane which lines the roof of the nasopharynx, a comparatively narrow and limited area corresponding to the basilar process of the occipital bone, and the body of the adjoining sphenoid. They are very firmly attached to both periosteum and bone. For example, in a transverse section through the base of this growth spicules of bone were found attached to the periosteum, which interfered with the cutting of the specimen. As the tumour grows, the base increases in extent and fresh attachments arise, due either to the spreading from the original source or to adventitious attachments being formed as a result of inflammatory action. In cases reported of additional origins—e.g., the margin of the internal pterygoid plate, within the spheno-palatine and spheno-maxillary fossæ—we may conclude that these were extensions from the original growth. Reference to sections through the base of the



Angeio-fibroma of the nasopharynx removed from a boy, aged 16. It measured 1½ in. in its longest diameter and 1¼ in. in its shortest. The broad basal attachment to the basi-sphenoid and occipital bones is shown, also its prolongation into the left naris.

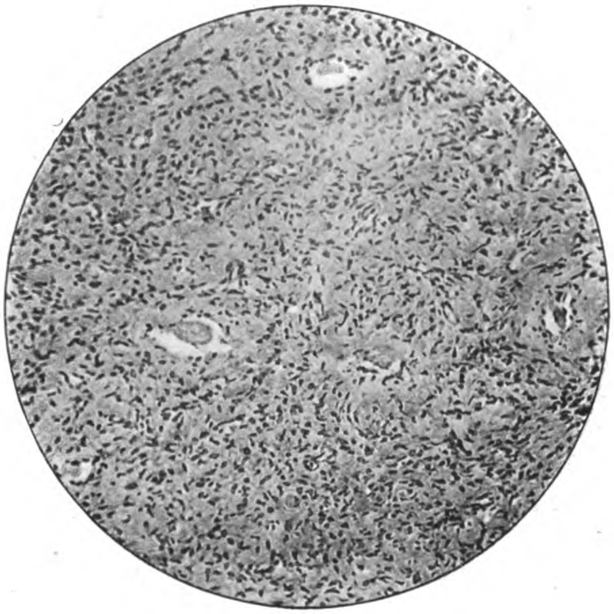


FIG. 1.

The fibrous element of the growth; the stroma is very rich in connective tissue cells. (Low power No. 3 with No. 4 eyepiece.)

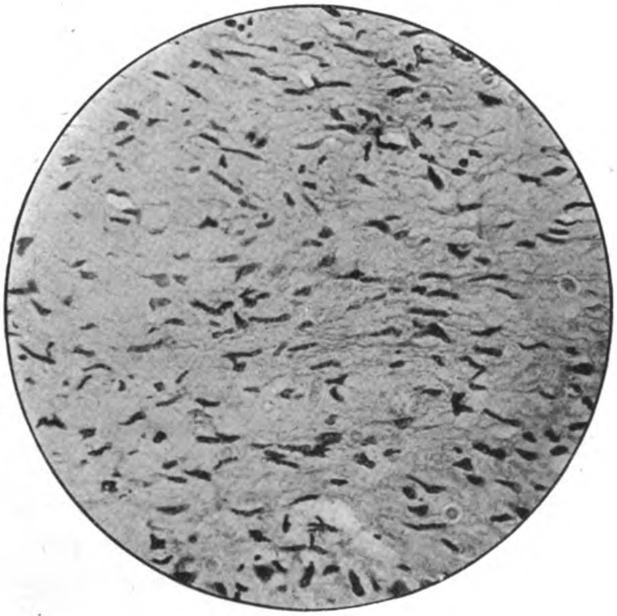


FIG. 2.

The same as fig. 1, more highly magnified. (High power Leitz No. 6 with No. 4 eyepiece.)

growth shows the fibrous tissue to be denser there than in other parts, and the naked-eye specimen shows the fibres disposed in lines converging from their basal origin.

THE INVESTING MEMBRANE.

Many authorities describe a "capsule" to these growths. They are covered by an investing membrane, which consists of the mucous membrane lining the vault, sometimes comparatively thick, but more frequently thinned away by the increasing pressure of the growth.

Fig. 5 shows a portion of the free surface of the growth with its investing mucosa attenuated and partially devoid of epithelial cells, but nothing which could be correctly described as a capsule; hence this term is misleading and is better not used. A few mucous glands may be seen a short distance below the surface.

THE VASCULAR SUPPLY.

Fig. 5 shows, both superficially and deeply placed, many thin-walled vessels and cavernous spaces. They are lined by a single row of endothelial cells, which are well seen in figs. 3 and 4. Being devoid of a contractile coat and embedded in the dense fibrous tissue, these vessels do not contract when cut across. In these tumours the central portion of the growth appears to be much more vascular than the peripheral portion, and here the cavernous spaces predominate; hence the risk of dangerous hæmorrhage through cutting into or tearing the body of the tumour, well shown in fig. 3, which should be compared with fig. 5. In one section through the base of the growth, the fibrous tissue is denser than elsewhere, and the number of vessels, although they are of considerable size, is relatively smaller. Here and there a vessel furnished with a muscular wall is encountered. This is of great importance from the operative point of view, and is a guide to the position for attack.

EPISTAXIS.

When this case was shown on March 5, Dr. Dundas Grant[1] suggested that the growth was not very vascular, since spontaneous epistaxis had not occurred, but though generally considered a characteristic feature of these growths, it certainly does not always happen. In

---

[1] *Vide Proceedings*, 1915, viii (Laryng. Sect.), p. 99.

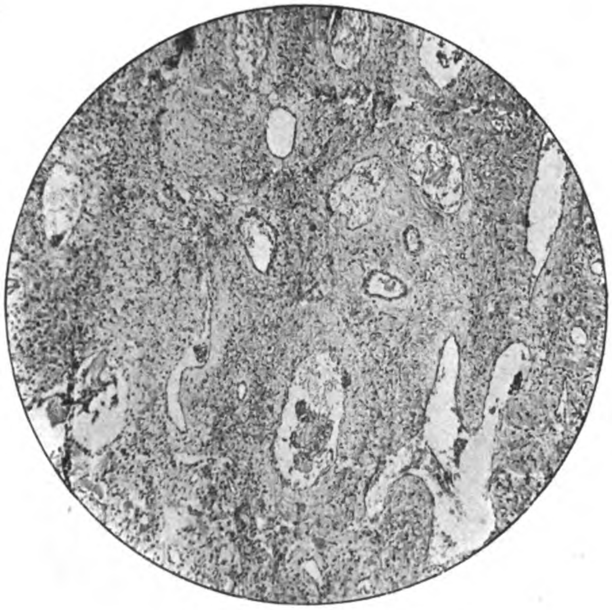


FIG. 3.

Showing the cavernous spaces lined by a single layer of endothelial cells. (Low power.)

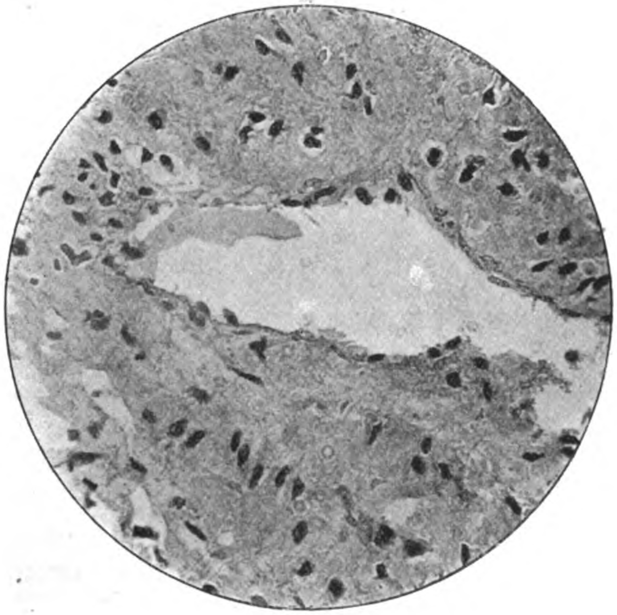


FIG. 4.

Showing one cavernous space of similar structure to those in fig. 3, highly magnified.

the earlier stages epistaxis is quite unusual. In the case shown by Mr. E. D. D. Davis[1] epistaxis was absent, as also in Dr. Peters' case,[2] shown at the Laryngological Society in 1906, and one reported by Mr. Guthrie.[3] These were all early cases. When bleeding does occur it is due to surface erosion, owing to the pressure of the growth on its investing mucous membrane. All these points require to be taken into consideration in determining the best method for the removal of these highly vascular growths.

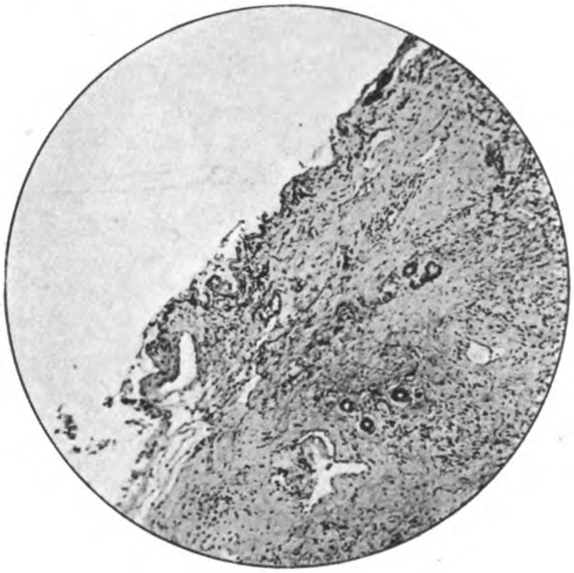


FIG. 5.

Free surface of growth showing some of the investing mucosa (the so-called capsule) and a few mucous glands, lying a short distance below the surface. (Low power.)

CONCLUSIONS.

(1) These tumours should, in my opinion, be approached via the mouth and nasopharynx, attacked at their base, and removed through the mouth. This is the route recommended by Doyen, Moure, Escat, Laurens, Lubet-Barbon, and other French surgeons. There is greater freedom of access by this route than through the nose, and since the prolongations of the growth into the nasal cavities cannot be determined

---

[1] *Vide Proceedings*, 1915, viii (Laryng. Sect.), p. 55.

[2] *Vide Proc. Laryng. Soc. Lond.*, 1905-06, xiii, p. 40.

[3] *Vide Lancet*, 1910, ii, p. 1271.

from the front, the separation of the main mass from behind permits these prolongations being more easily followed up and dealt with. With the soft palate tied back by two pieces of thin rubber tubing passed through the nostrils and out at the mouth, it is astonishing the amount of room available—quite as much as that obtained by splitting the soft palate.

(2) The base of the growth and its extensions or adhesions to adjoining parts of the nasopharynx should be peeled with the periosteum from the bone by means of sharp periosteal elevators, starting posteriorly in close proximity to the growth, and working round and over it as far as the choanal margin from behind forwards and from side to side. In this way the large blood sinuses in the central part of the growth can be avoided. With the patient in the hanging-head position the nasal channels are free to carry off the profuse stream of blood which pours out of the nasopharynx, and this does away with the necessity for a preliminary tracheotomy or laryngotomy and tampon in the larynx.

(3) The growth should not be seized by forceps until its base has been detached, in order to avoid tearing into its central portion. By means of strong clamp forceps the main mass of the growth is then seized and removed by evulsion, tearing away with it the nasal or other prolongations which extend into the adjoining cavities; these are usually much less firmly attached than the base. If, however, they are too firmly adherent to be torn away, curved periosteal elevators passed through the mouth into the choanæ, or through the anterior nares, may be employed to separate them.

(4) The operation should be performed rapidly and no time lost in trying to staunch the excessive hæmorrhage which invariably occurs, but which ceases spontaneously as soon as the growth and its attachments have been removed. There is no doubt but that there are few of these growths that cannot be reached through the natural passages and extracted with less danger and better results than after extensive and disfiguring operations through the face. Resort to such measures is rarely warranted, and certainly not when the growth is in the earlier stages.

DISCUSSION.

Sir WILLIAM MILLIGAN: I think that Dr. Irwin Moore has indicated a very important point—viz., that these large blood-vessels are held by fibrous tissue, and are therefore unable to retract. In other words, they are canalized, and for that reason I think it is advisable, before operating, to tie the external carotid artery; it makes a good deal of difference in regard to the comfort of the operation, and if it is done immediately before operating there is no time for the setting up of a collateral circulation. If I had known this case was to have been brought forward again, I could have contributed to the discussion by showing specimens, &c. I want to ask whether any members of the Section have ever had such an unfortunate accident as I had the other day in dealing with a similar case. I was operating on a boy, aged 16, who had a growth as big as that in Dr. Moore's case; I tied the external carotid artery and removed the growth with difficulty. The boy was put back to bed, but in twenty-four hours he became extremely weak and died. We are unable to ascertain any reason for his death; it was not from hæmorrhage, as there was so little of that. It is the only accident I have had in such a case, and I have removed a fair number of such growths. With regard to the capsule, I think the fact that these growths almost invariably recur sooner or later is one of the points which make one conclude there is no real capsule, and the microscopic section shows simply a mucous membrane covering, attenuated in some parts, thickened in other parts. As to situation, my experience has not been that they grow from the basi-sphenoid, but from the lateral wall, at the junction of the posterior and lateral walls of the nasopharynx, in the region of the Eustachian tube. Very few of these growths are pedunculated; they have broad-based attachments, so that it is very difficult to get anything like a loop of wire round them. Mr. Guthrie a short time ago published, in the *Liverpool Medical Journal*, a method of dealing with these growths by removing subcutaneously a portion of the nasal process of the superior maxilla, which gives a much better view from the front and more room for working.

Dr. DUNDAS GRANT: We are indebted to Dr. Irwin Moore for having shown us so beautifully that the vascularity is chiefly in the interior of these growths rather than at the site of origin. I would recommend very strongly the mode of access to them through the nose, passing a periosteal elevator through the nasal passage. With the finger of the operator in the pharynx, one can attack the base very well, especially if they are attached as much to the inner surface of the internal pterygoid plate as to the basi-sphenoid. And we ought to distinguish these sessile growths from those which have their origin in the antrum of Highmore, and which acquire an adventitious adhesion and do not grow from the nasopharynx, though they appear to do so. For the latter cases a different method of treatment has to be carried out—namely, through the antrum. They are apt to be lumped together with the others in compiling statistics, and formulating treatment too. It was instructive to hear what Sir William Milligan had to tell us, and it is, perhaps, because so few of us have had any number of such cases that a similar accident has not come before us. One does not know whether delayed chloroform poisoning or some similar coincidental misfortune may have had something to do with the death.

Mr. W. STUART-LOW: I have had a number of these cases which I have shown here, and they were all successful. I lay great stress upon getting the soft palate out of the way; if this is done it facilitates the speed of the operation. This is best carried out by splitting it freely, and then stitching it up after finishing the operation. The easiest and most effective method of controlling the hæmorrhage consists in pushing a sponge-holder carrying a small sponge into each nostril. As the growth is displaced the assistant pushes these sponges into position, and so arrests the bleeding.

Mr. HERBERT TILLEY: I submit that there is no one method we can adopt for the operative treatment of these growths. I am rather tired of referring to the case which I have shown here on more than one occasion, in which, after removal of a very large growth from the postero-lateral portion of the nose, there were three separate recurrences. In that patient I split the soft palate and removed part of the hard palate, so that good access to the growth was obtained. But as it recurred, it was obvious I was not getting at the origin of the growth. Dr. Pegler was present at the final operation, when we opened the maxillary antrum, having removed the ascending process of the maxillary bone, and found the growth very firmly attached to the whole posterior wall of the antrum. It is obvious you cannot remove a growth from that position through the mouth: it must be approached through the face. Hence there are contingencies which necessitate operation through the nose or by a modified Rouge's operation. When the growth springs from the basi-sphenoid, as we used to be taught, one can operate through the mouth by Doyen's method. I do not think these growths spring from the basi-sphenoid as often as from the spheno-ethmoidal recess, so they are not, strictly speaking, nasopharyngeal growths, but post-nasal; and should be classed with diseases of the nose rather than with those of the nasopharynx.

Mr. LAMBERT LACK: There is no one method of dealing with all these cases; they vary so much that one must be prepared to deal with them in different ways. Some can be removed successfully with a thick wire snare, some require a far more severe operation. In one case, in which I used a snare, the patient remained free twelve years, but he has now a recurrence. In another case I performed the Watson-Williams operation, opening the nose from the front, because the growth spread up into the nose, and I think that was the best method of reaching it. At any rate, the operation was done six years ago and the patient remains well. In a number of cases the growths spring from the side of the nasopharynx, where it is impossible to remove them surgically at all, and in such cases I think we should certainly try radium and X-rays.

Mr. E. D. D. DAVIS: I have had four of these cases. In two of them Mr. Waggett and I split the palate, and in two the palate was retracted. The latter two went very much better than the others. In a young subject you get a very good view of the growth by pulling the palate well forward and pushing it up, almost against the roof of the mouth. There were prolongations into the nose. The cases did well, and the sections show that they were fibromata attached to the posterior wall of the nasopharynx.

The CHAIRMAN (Dr. Donelan): I think Dr. Irwin Moore is to be congratulated on his demonstration and the discussion which has taken place. We gather from that discussion, as Mr. Tilley has so well pointed out, that each case requires its own special method of treatment.

Dr. IRWIN MOORE (in reply): In answer to Sir William Milligan, as to tying the external carotid, in looking up the literature in reference to these growths I find a case is reported by an American surgeon in which, though he tied the carotid, the hæmorrhage still continued. With regard to Dr. Guthrie's method, he uses a periosteal elevator through the nose. But I think this is beginning at the wrong end because, if, as in my case, there is a prolongation of the growth along the roof of the nose, this interferes with one getting above the base of the main growth in the post-nasal space. I did not know there was a prolongation into the nose in my case until I had got under the periosteum and stripped the growth off the roof of the post-nasal space, and had grasped the growth with forceps; then I found that it was attached to the spheno-ethmoidal recess, and I had to separate it by using a periosteal elevator, passed through the front of the nose. If such prolongations cannot be easily torn away along with the main growth after the latter has been detached, they may be loosened in the above manner. I agree with Mr. Tilley that there may be no one method of removal for advanced cases, but in most cases, and especially in the earlier stages, the procedure described above is certainly the best.

(*December* 3, 1915.)

Some New Instruments specially designed for Improving the Technique of the Operation of Laryngo-fissure (Thyrotomy).

By IRWIN MOORE, M.B.

DEMONSTRATION of some instruments specially designed and recommended by exhibitor for improving the technique of this operation:—

(1) Thyrotomy shears.
(2) Thyrotomy saw.
(3) Self-retaining laryngeal retractor.
(4). Intra-laryngeal scissors: (*a*) straight, (*b*) curved on the flat, (*c*) rectangular.

The above named instruments which I have devised for this operation have been for some years in use, though they have not yet been formally introduced to the profession, since it was my desire that they should first stand a fair trial. They are now used and recommended by many of my colleagues.

THYROTOMY SHEARS.

Designed for splitting the thyroid cartilage in the middle line so as to expose the inside of the larynx. They are very strongly made and are used in the same way as scissors. They will divide the cartilage with one clean cut without causing any crushing or damage, thus avoiding the risk of perichondritis and sepsis. The lower blade has a very fine saw edge, and is curved and pointed to facilitate its introduction through the crico-thyroid membrane under the lower edge of the larynx, and upwards between the vocal cords. The upper blade is provided with a sharp spike at the extremity of its cutting edge in order to transfix the larynx and keep it steady during the cutting. The position of the handles in relation to the blades is such that they are well away from the neck, so that the tracheotomy tube previously inserted in the trachea does not get in the way of the operator's hands.

Experience has proved the great advantage of these cutting shears over any other instrument used for this purpose. They may also be used in the treatment of stenosis of the larynx for the operation of laryngostomy—i.e., laying open the larynx anteriorly and keeping it open for a long period of treatment. In such a case they will divide the cartilage and soft parts, including the skin, at one cut.

THYROTOMY SAW.

This is a small fine saw which is not so cumbersome as those formerly in use. It is intended for partially sawing the larynx before using the shears in those cases in which the upper and lower edges of the thyroid cartilage are ossified—so frequently met with in elderly people. The depth of the saw-blade is only 4 mm., so that it cannot do any damage to the intra-laryngeal soft parts. The shaft is bent in such a way that when the saw is used by the operator standing above the head of the patient, the patient's chin does not get in the way of the operator's hands. If it is used from below, the operator's hands are well away from the neck and do not come in contact with the tracheotomy tube.

SELF-RETAINING RETRACTOR FOR LARYNX.

This instrument is made on the principle of a nasal retractor. It is useful for separating the lateral halves of the larynx after they have been split open by the shears, and retaining them in any position. With this retractor the larynx may be opened and closed, gradually or quickly, with the greatest facility without overstraining or damaging the cartilage, as may occur with ordinary hand retractors. The retracting hooks may be so adjusted on either side of the retractor that they do not interfere with the dissection of the growth from the inner wall of the larynx. It does away with the necessity of an extra assistant.

INTRA-LARYNGEAL SCISSORS.

(*a*) Straight.
(*b*) Curved on the flat.
(*c*) Curved at right angles.

These have been made with small yet very strong blades and long shafts, which are strengthened to prevent any strain and consequent giving way in the cutting blades. After the perichondrium and soft parts have been raised from the inner wall of the larynx by the periosteal elevator, these scissors are of great service in cutting away the growth along with a portion of the surrounding normal tissue.

The straight scissors, or those curved on the flat are used in making the upper and lower incisions—i.e., above and below the growth, from before backwards.

The rectangular scissors are used to separate the mass posteriorly from the arytænoid cartilage.

(*December* 3, 1915.)

Paralysis of the Right Vocal Cord resulting from a Bullet Wound.

By F. A. ROSE, F.R.C.S.

A SOLDIER wounded at Armentières on October 20. The bullet apparently grazed the left thumb, left side of chin, entered the neck 1 in. above left margin of sternum, and came to rest in the chest wall in the neighbourhood of the right third rib, as shown by a skiagram. Surgical emphysema appeared in the right side of the neck and lasted one week; the patient also spat up small quantities of blood for several days. Since admission to St. Bartholomew's Hospital, under Captain Ball, there has been an attack of diaphragmatic pleurisy on the right side. The right vocal cord presents the appearance of abductor paralysis.

DISCUSSION.

Dr. DAN McKENZIE: Perhaps I may be allowed to mention the sequel of a case I showed at the last meeting, that of a bullet wound of the neck which I thought had gone through the vagus nerve. The patient has since been submitted to operation and the vagus exposed, and it was found that that nerve had not been cut, but it was tightly bound up by adhesions, from which it was released. I have not seen the patient since the operation. Our President expressed the opinion that the vagus had not been cut, his alternative suggestion being that it was bruised.

Dr. D. R. PATERSON: I had under my care a soldier who was injured by the explosion of a shrapnel shell while he was lying in his dug-out. He was awakened by the explosion, and found that his voice had gone. A spicule of shrapnel had traversed his carotid sheath, the point of entry being almost opposite the thyroid cartilage; one could see the spicule in front of the vertebra. There was complete paralysis of the left recurrent nerve. In Mr. Rose's case there appears to be some slight movement. In our case we did not feel justified in cutting down upon it. The loss of voice followed immediately on the injury.

Sir WILLIAM MILLIGAN: At a previous meeting I showed a skiagram of a bullet embedded in the second cervical vertebra. The only lesion was left recurrent paralysis. The bullet remains in the vertebra to this day. The man is well, except for paralysis of his vocal cord. Something must have happened to the vagus in his case.

Dr. JOBSON HORNE: The man has a remarkably good voice at present. Not a few such cases have come under notice, and the lesson of experience is that so far as surgical exploration is concerned the less that is done the better.

Dr. DUNDAS GRANT: It would be interesting to note whether, and after what interval of time, the right vocal cord passes from the position of abductor paralysis into that of complete paralysis illustrating Semon's law: and whether at that time the voice will again become husky.

Mr. ROSE (in reply): I showed the case because, although we have seen a series in which the left cord has been paralysed by a bullet, this is the only one in which I have seen right-sided paralysis. The patient has several wounds on the left side of the body, he has none on the right side; therefore the bullet must have entered the left side of the body and travelled across the middle line. It is highly probable his trachea was bruised, if not perforated, because surgical emphysema appeared on the right side of the neck, and for several days he spat up blood. The bullet is clearly visible on the right side, in the chest wall, near the third rib.

(*December* 3, 1915.)

Unilateral (Left) Paralysis of Soft Palate and Larynx.

By CHARLES A. PARKER, F.R.C.S.Ed.

J. D., AGED 27, telegraphist, eighteen months ago noticed his voice was gradually getting weak. Came to Golden Square Throat Hospital in October, 1914, when he was found to be suffering from left unilateral motor paralysis of the soft palate and complete paralysis of left vocal cord. There was no history of any preceding illness. There was some subjective improvement after a course of strychnine.

Patient came to the hospital again a fortnight ago as his voice had become hoarse as well as weak. The conditions of left half of palate are just as they were a year ago, the left cord remaining completely paralysed. The hoarseness is accounted for by a tag-like thickening of posterior third of the right vocal cord.

Suggestions as to the nature and position of the nerve lesion are invited.

DISCUSSION.

Dr. JOBSON HORNE: I consider that the case calls for a good deal of clinical investigation before an opinion can be usefully expressed. The clinical condition of the soft palate and larynx reminds me of a case of syringomyelia I brought before the Laryngological Society of London in 1897.

Dr. DUNDAS GRANT: There may be an isolated spot of sclerosis at the root of the vagus nerve.

Mr. HERBERT TILLEY: Those who are interested in this class of case will find in the Laryngological Society's *Proceedings* the reports of two similar cases shown by me many years ago. One was that of a man whom we thought had pachymeningitis at the base of skull. He had the left vocal cord, left side of palate, the upper part of the left trapezius and the left sternomastoid paralysed. It is a class of case of which examples were shown by Sir Morell Mackenzie and Sir George Johnson, and quoted by Sir Felix Semon in one of his monographs on the subject.

Dr. BANKS DAVIS: I showed a case very similar,[1] in which there was paralysis of the left side of the tongue and palate, and of the left recurrent laryngeal, and it was regarded as a specific pachymeningitis. As he had difficulty in swallowing, we took him into the hospital. At the post-mortem examination we found he had a large cancer at the base of the tongue which he had not complained of during life.

---

[1] See *Proceedings*, 1913, vi (Laryng. Sect.), p. 177.

(*December* 3, 1915.)

Malignant Disease (?) of the Arytæno-epiglottic Fold and Ventricular Region of the Left Side of Larynx.

By IRWIN MOORE, M.B.

FEMALE, aged 38. Came to hospital on November 15 complaining of difficulty and pain in swallowing, together with hoarseness of the voice for two months, and feeling as if there were a lump in her throat. For six weeks there has been vomiting immediately after food, and patient has been losing weight. Palpation of larynx causes considerable pain on left side, suggesting perichondritis. No glands in the neck can be felt. No history of syphilis. There is marked œdematous infiltration of the left arytæno-epiglottic fold and ventricular band, together with paresis of the left vocal cord.

DISCUSSION.

Mr. HERBERT TILLEY: I think that the condition is inflammatory, and not a new growth.

Dr. JOBSON HORNE: The clinical appearances do not suggest to me malignant disease of the larynx. Tuberculosis should be completely excluded from the diagnosis in the first place.

(*December* 3, 1915.)

Halfpenny impacted for Five Days in the Œsophagus of a Child, aged 4.

By IRWIN MOORE, M.B.

THIS case occurred at a general hospital in the suburbs, and illustrates the great advantage of the more modern method of endoscopy over the old coin-catcher. Though the position of the coin was well shown by X-rays at the level of the seventh cervical vertebra, all attempts to seize it with the coin-catcher failed, owing to the coin lying against the posterior wall of the œsophagus, and so the instrument missed it by passing up and down in front of it. Five days later the coin was removed without any difficulty through the œsophagoscope. Œsophageal wall undamaged. Patient left hospital next day.

Specimen shown, also radiogram by Dr. David Arthur.

DISCUSSION.

Dr. PATERSON: I had a case in which a halfpenny had been in the œsophagus eighteen months, and it looked as if it had been dug out of some Roman ruin. As in Dr. Moore's case, the child had gone to a general hospital, where it had been submitted to a coin-catcher, and as it failed to bring anything away the child was sent home. After eighteen months there were some tracheal symptoms, and at hospital the coin was discovered. These cases are common now, and I think it is time the authorities at general hospitals recognized that the direct method is the proper one, and that such cases should not be submitted to a coin-catcher.

Sir WILLIAM MILLIGAN: I want simply to remark that I think it is on the posterior wall that these coins always lie. It is right to recognize this, because even with the œsophagus tube it is possible to pass over a halfpenny without knowing it. I associate myself with Dr. Paterson's remark; I think hospitals should give definite instructions to house surgeons not to use the coin-catcher. It is lamentable the state the œsophagus is brought into sometimes by the inexperienced trials at removal of foreign bodies. If these cases were at once sent to the right department, the right method would be used. I have several times seen fatal cases as the result of the wall of the œsophagus being torn by means of coin-catchers. I would suggest that this Section frame a resolution and forward it to the various teaching hospitals in the country.

Mr. HOWARTH: I should like to relate a case illustrating Sir William Milligan's remarks. At a hospital with which I am connected an attempt was made to extract a halfpenny from a child's œsophagus by means of a coin-catcher. The child bit the coin-catcher, broke off the end, and this was swallowed. It became impacted in the pylorus and had to be removed by laparotomy, and the coin, which remained impacted in the œsophagus, was removed by the direct method. Since this occurrence the coin-catcher has been banished from the casualty department at that hospital.

Dr. F. DE HAVILLAND HALL: I certainly think some representation on this subject is desirable, but not to a Lay Committee. I think that if the Section were to draw up a communication and send it to the members of general hospital staffs, it would be very desirable indeed. The time has come for pronouncing that the direct method should be employed in these cases, instead of using the coin-catcher.

(*December* 3, 1915.)

Tin Disk, 1⅜ in. in Diameter, removed from the Gullet by the Direct Method.

By D. R. Paterson, M.D.

A lance-corporal, serving in the trenches, found after swallowing a piece of bully beef that the disk usually placed inside the tin had been attached to it and got stuck in his throat. On being admitted to the Third Western General Hospital under exhibitor's care six days later, a skiagram showed the disk opposite the sternal notch. On examining through the œsophagoscope it was noted that the gullet, distended laterally, was sloughing where the edge of the disk impinged on it, and there was a fœtid odour. After making out its bearings, a large-sized tube (20 mm.) was passed, and the disk being well exposed was loosened by careful manipulation and drawn up along with the tube. The disk is rather larger than half-a-crown, with its edge turned up at three points.

(*December* 3, 1915.)

Large Irregular Piece of Bone, impacted in the Œsophagus, removed by Direct Method; Death from Sepsis Six Days later.

By D. R. Paterson, M.D.

The patient, a short, thick-necked man, aged 35, swallowed a piece of bone in some soup, and was seen some hours later by a doctor, who tried without success to pass a bougie. When seen next day by the exhibitor, inability to swallow was absolute. Direct examination showed the mass opposite the level of the sternal notch with some œdema of the gullet mucosa above it. By passing a 20-mm. tube a good view was obtained of its upper aspect, from which a sharp process impinged into the left side of the gullet. The mass was firmly impacted, and owing to its size and shape ordinary forceps failed to grasp it properly or move it. On the following day, with Irwin Moore's forceps, a good hold and better control was obtained. Careful attention being paid to protecting the mucosa from the sharp projection on the left, steady traction with some lateral movement was made and the mass was removed without much difficulty. Examination of the parts immediately after showed slight bleeding from the œdematous mucosa on the right, which had apparently been scored by a ragged edge of the bone. The patient did well until the fourth day, when the temperature went up; there were pain and tenderness on the right side of the neck, and he died two days later, apparently from septic absorption. No autopsy was obtained.

The foreign body—part of a vertebra—has one end smooth and conical, which facilitated entrance into the œsophagus; the other—the upper surface as it lay *in situ*—being oblique with a fractured surface, measures 1 in. (23 mm.) transversely, and ¾ in. (17 mm.) antero-posteriorly. The prominent sharp process on the left side was protected during extraction, and it was evidently the sharp right edge, which lay deeper and could not be so well examined, that caused the lesion. Before extraction, the question of œsophagotomy was considered, and it was thought the site of impaction and the short thick neck of the patient precluded it.

DISCUSSION.

Sir STCLAIR THOMSON: I would like to draw attention to the great danger connected with such septic bodies as pieces of bone in the œsophagus: they are much more dangerous than such articles as tin disks or halfpennies. I have removed from a gullet a denture which had been there two and a half years, and had not led to any septic trouble, and not long ago I removed a piece of hare-bone (from hare soup, a highly septic concoction), which had been in a man's bronchus six to eight months. But when septic bodies are in the œsophagus, and even when removed with all the art of which we know Dr. Paterson is capable, still extraction is a very dangerous proceeding, and we should be careful about our prognosis.

Dr. DAN MCKENZIE: I think that the matter of sepsis in Dr. Paterson's case raises a very important question indeed, and that is whether it is possible to know when it is better to perform an external operation on those cases rather than attempt removal by internal manipulations, even through the endoscope; because in a case of this description only external operation would give the patient a chance. Having seen the foreign body, I consider it is remarkable that Dr. Paterson should have succeeded in getting it out at all. It is wedge-shaped, angular, and the œdematous mucous membrane had lapped over the sharp edges of the base of the wedge as it lay point downwards in the œsophagus. Here an external operation might have given the man more chance. Of course, it would often be impossible to determine when external operation should be preferred.

Dr. HILL: It may perhaps be suspected that the employment of an endoscope of so large a diameter as 20 mm. has something to do with the fatal result in one of Dr. Paterson's cases. I do not think that is so, however, as I have for many years consistently employed œsophagoscopes of 18-mm. and 20-mm. diameter without any evidence of harm resulting. I was led to adopt tubes of large calibre after Dr. Paterson had reported a case of a large bone in the gullet, which he only succeeded in removing after improvising an endoscope out of a bicycle frame tube 20 mm. in diameter. Chevalier Jackson's largest œsophagoscopic tube is 10 mm., and Killian's tubes and also v. Brünings's outside tubes do not exceed 13 mm. in diameter. In my experience, however, the use of the large-calibre tubes introduced by Dr. Paterson greatly facilitates endoscopic procedures for diagnosis—and, of course, more especially in treatment—and mark a great advance in technique.

Major KENT HUGHES: I had a case in which a halfpenny was swallowed by a child five months before, and the patient was brought to a children's hospital on account of broncho-pneumonia. There was a history that something had been swallowed, and the X-rays showed a halfpenny in the posterior mediastinum, and it had ulcerated through the right posterior wall of the œsophagus. We managed to remove it by cutting away a part of the clavicle and two ribs. The child died of broncho-pneumonia. With regard to external operation for removal of a foreign body in the œsophagus, I have done œsophagotomy for such a case once, and I do not want to do it again. It was the case of a man who swallowed an upper metallic denture. It lodged 2 in. below the sternal notch, and nothing I did made any impression up or down. I did not like to do much to it, as it was so tightly impacted. I did a low œsophagotomy and with great difficulty removed the denture with a strong pair of Spencer-Wells forceps. If anyone does this operation, I advise him at the same time to remove the jugular vein. This man went on well for two days, and then ate quickly an unripe pear which the occupant of another bed had given him while the nurse's back was turned. His œsophageal wound was split, and I had to cut through the lower end of the sternomastoid muscle so as to get better drainage. The jugular vein ulcerated, and whilst the house-surgeon was dressing him there was violent hæmorrhage, which was controlled by a double ligature round both vessels. In view of the fact that one so often gets sepsis following œsophagotomy, I should now remove the internal jugular vein at the outset.

Mr. LAMBERT LACK: I do not know whether members will approve of a procedure I once adopted. To avoid œsophagotomy, I pushed the foreign body—a large tooth-plate—into the stomach, and left the surgeon to deal with it by that route, a much simpler and safer procedure than œsophagotomy. Some foreign bodies which will not come up can be pushed down easily.

Dr. IRWIN MOORE: I should like to congratulate Dr. Paterson on so successfully removing the tin disk by means of an œsophagoscopic tube. At our meeting on February 5, 1915, Mr. Whale reported a similar case—a piece of tin with the same measurements, i.e., 1⅜ in. diameter—which he was obliged to remove by œsophagotomy. I think the question of using bigger tubes is a very important one, for it would appear that the lumen of the œsophagus is much larger and more distensible than we are accustomed to think it is, and it is evident that we can safely use much larger tubes for the removal of foreign bodies.

Mr. E. D. D. DAVIS: I had, last week, a case in which a hare-bone was impacted. When I removed it by the œsophagoscope it was surrounded by an abscess. The patient, a lady, aged 48, died suddenly forty-eight hours later of mediastinitis and a double pleural effusion; the pus had tracked downwards between the anterior wall of the œsophagus and the trachea, and led to the fatal result.

Dr. PATERSON (in reply): I brought this case forward to call attention to the great advantage of these very large tubes. As Dr. Hill has said, I have used them for many years, and I have not noticed any difficulty or after-trouble. I do not think the large tube was responsible for the fatal result. I think it was due to some tearing of the œsophagus during the extraction of the bone. Those who have seen the foreign body will realize the difficulties which were met with. The question of an external operation—raised by Dr. Dan McKenzie—is very important, and was carefully considered at the time. The man had a very short, thick neck, and the foreign body being down at the sternal notch, it meant our going into the mediastinum, and the chance of successful œsophagotomy was very small. The direct method was preferred. The difficulty of extraction was not very great, and such a result was very disappointing, because he went on very comfortably for four days, and then suddenly the septic condition occurred. If there had been any warning of this onset naturally one would have opened the part. I particularly recommend the large tube.

(*December* 3, 1915.)

Laryngeal Case for Diagnosis.

By IRWIN MOORE, M.B.

MALE, aged 53, complaining of hoarseness for one month, gradually getting worse. History of syphilis twenty-seven years ago. The right vocal cord is thickened, œdematous, and restricted in its movements. There is also some infiltration on the inner surface of the right arytænoid.

Dr. JOBSON HORNE : I assume that the all-important point to be eliminated in this case is the presence of malignant disease of the larynx. Personally, I can see no evidence of malignant disease.

(*December* 3, 1915.)

Case for Diagnosis.

By IRWIN MOORE, M.B.

MALE, aged 27, complains that he has suffered from swollen glands, both sides of neck, for one month. He has been unable to swallow solid food for three days, and can only take liquid food with considerable pain.

DISCUSSION.

Major KENT HUGHES : I think that the lesion on the inside of the lower lip is undoubtedly a primary chancre. There is, in addition, a faint rash on the skin, and the very large glands are almost diagnostic of a primary syphilitic infection in the neighbourhood.

Dr. JOBSON HORNE : I agree with the diagnosis; so far as one can judge in the artificial light, there appears to be a secondary eruption on the face. On palpation neither the sore on the lip nor the corresponding gland at the angle of the jaw yields the same induration as in similar cases I have examined. The glandular condition is dominated in this case by the extensive tonsillar involvement.

Dr. BANKS DAVIS: I have seen a good number of cases of the kind, and I think that if the chancre is at the junction of mucous membrane and external skin of the lip, there will be an enormous collar of glands, so that the case may be mistaken for mumps. If it is on the inner side—i.e., mucous membrane—there will not be the same glandular involvement, and the glands will be soft.

(*December* 3, 1915.)

Case of Chronic Dacryocystitis cured by West's Intranasal Operation after Failure by External Operation.

By HERBERT TILLEY, F.R.C.S.

MRS. E. was operated on by the external method by an ophthalmic surgeon three and a half years ago for chronic suppuration in the right lachrymal sac. A suppurating external fistula remained. On July 27, 1915, I performed West's operation, and last week received a letter from the patient saying "I am better than I have been for six years."

(By West's operation is understood the exposure of the lachrymal sac in the nose, and the removal of the greater portion of its inner wall; in the large majority of cases the stricture is at the junction of the sac with the lachrymal canal, and hence the operation provides permanent drainage into the nasal cavity above the stricture.)

DISCUSSION.

Dr. DUNDAS GRANT: It is an admirable result, and I should like to ask whether Mr. Tilley has any information as to what the external operation was, whether it was complete excision of the sac or possibly an imperfect one?

Mr. HOWARTH: I have operated upon about a dozen such cases, and the result is extremely satisfactory. Ophthalmic surgeons say that sometimes after these operations you still get a mucocele and some discharge through the canaliculus, owing to the lower part of the sac being left and bulging down. This can be overcome by taking away the upper part of the duct as well as the sac, and I do that in my cases now. I have had no untoward results, and certainly the cases have done well.

Dr. PATERSON: In two cases I have had there has been some closure of the opening after the operation. Both of them were cases of syphilis, and I think it well definitely to ascertain whether syphilis is present in such cases, and, if so, to make a large opening. In both my syphilitic cases, which closed afterwards, I made a much larger opening. I used the small punch-forceps which Dr. Watson-Williams employs for enlarging the entrance to the frontonasal duct. Another difficulty I have met with occurred also in a syphilitic case, in which considerable retraction and bony change had taken place. The position of the sac is sometimes determined, and one can combine it with Toti's operation; I have done it in two cases, with very satisfactory results. Another instance where I had the same difficulty occurred in a man who had a very severe injury, his face being driven in, and so the position of the sac was very difficult to determine. We started inside, and found the bone was so thick, and it was so indefinite, that we did an external operation at the same time, and by combining them we secured a very good result.

Dr. JOBSON HORNE: It is interesting to note how long it takes for a scientific suggestion to become generally known and adopted. Speaking from memory, I think I am right in stating that as far back as the eighteenth century an English surgeon pointed out that dacryocystitis could be successfully treated by an operation performed through the nose.

Major KENT HUGHES: In former years I did a good deal of eye work, because in Melbourne, specialities are not so sharply divided as here. Some of the failures of West's operation may be due to the fact that ophthalmic surgeons make false passages in these cases more often than they know. I say this advisedly, because for several years I have tried to cure this condition by making a new mucus-lined tube for the lachrymal duct, dissecting the whole sac and duct out. I placed a hollow tube surrounded with mucous membrane in the lachrymal groove. It answers very well at the time, but it is difficult to get enough tissue there to prevent subsequent contraction. I suggest that when the rhinologist fails in curing the lachrymation it may be due to the fact that there are two or three false passages in the upper part of the tract.

Mr. TILLEY (in reply): I was asked, in the other room, "How do you know exactly where the sac is when you look up the nose?" There is an easy way of finding it, namely, to take a pair of forceps with biting edges, such as we use in detaching the tissues covering the capsule of the tonsil. Pass one arm of the forceps outside the nose till the end rests on the lachrymal sac; the other arm is passed up within the nose and, by pressing it towards the outer arm, a small blood spot can be made which will reveal the situation of the sac inside the nasal cavity.

(*December* 3, 1915.)

Microscopic Specimen of Recurrent Epithelioma removed from the remains of the Right Ventricular Band of a Patient who had been Operated upon for Epithelioma of the Right Vocal Cord Nine Years ago.

By HERBERT TILLEY, F.R.C.S.

PATIENT, Mr. E., aged 71, underwent thyro-chondrotomy in May, 1906, and until the last four months he had no laryngeal symptoms. He then noticed an alteration in his voice, it became more gruff and his throat ached after much talking. Having seen him every six months since the operation, I was surprised in October to notice a localized swelling in the anterior half of the laryngeal mucous membrane corresponding to the situation of the right ventricular band (removed at original operation). This increased in the course of three weeks, and when examined on November 7 the appearance was that of a greyish-pink, localized, slightly nodulated swelling about the size of a pea. I opened the larynx again on November 18, and found the nodule suspicious in its appearance, but soft to the feel. Fearing it was a recurrence of the old trouble, I removed all the soft tissues which covered the internal aspect of the right thyroid cartilage. The patient made a rapid recovery, his temperature not having risen above normal when he left the home ten days after operation.

The case is recorded because of the anxiety caused to both the patient and myself by the rapid development of symptoms and pathological appearances in the situation of a former operation for squamous epithelioma.

Dr. Teale cut sections of the nodule and reported that it was definitely epithelioma. So it is a recurrence nine years after the primary operation. It is somewhat remarkable that amongst my operations for malignant disease of the vocal cord by thyro-fissure, I am able to record recurrences five, six, seven, nine, thirteen and fifteen years after the primary operation.

(*December* 3, 1915.)

Case of Carcinoma of the Superior Maxilla with Secondary Glands in the Neck; Operation; no Recurrence after Two Years.

By W. M. MOLLISON, M.C.

E. C., FEMALE, aged 45, was shown at a meeting of the Section in May, 1914, after operation for carcinoma of the left maxillary antrum and removal of malignant glands in the neck in January, 1914. Now, nearly two years after operation, she remains free from recurrence.

(*December* 3, 1915.)

Case of Sarcoma of the Ethmoid; Operation.

By W. M. MOLLISON, M.C.

N. R., FEMALE, aged 20, was seen at Guy's Hospital in February, 1915, on account of pain about the right eye and swelling in the region of the nasal process of the right maxilla. She had some right-sided nasal obstruction. Examination of a piece of tissue from the ethmoidal region showed the case to be one of sarcoma. Operation was performed through Moure's incision, and the nasal process of the maxilla removed and the ethmoidal cells opened; these were found to be filled with soft growth, and finger-like processes projected downwards and hung into the antrum; the origin of the growth appeared to be from the lining of ethmoidal cells. The whole growth came away easily and seemed almost to be encapsulated.

There is as yet no sign of recurrence, and the patient feels perfectly well.

DISCUSSION.

Mr. HOWARTH: Sarcomata of the ethmoid are often very amenable to surgical treatment, as they appear to be of only a low degree of malignancy, and that delays any recurrence. Moure's operation is in most cases an excellent procedure; it gives admirable access to these tumours of the ethmoid, and one can often remove the whole growth and much of the surrounding tissue in a case that does not look by any means hopeful.

Dr. DAN MCKENZIE: If these cases are watched afterwards, sometimes one can see the first sign of recurrence, and if the cautery is then applied it will stop the progress of the disease.

(*December* 3, 1915.)

Sarcoma of the Tonsil (?); Mass of Glands in Neck; Removal of Tonsil.

By W. M. MOLLISON, M.C.

C. A., AGED 37, complained of enlargement of the glands in the right side of the neck, extending as high as the parotid region, also an enlarged tonsil. On examination, the right tonsil was seen to be much enlarged, but normal in shape and consistency. The glands in the neck appeared to be discrete and fairly soft; glands were also felt in both epitrochlear regions, in the axillæ, and in the inguinal regions. A blood count kindly carried out by Dr. P. P. Laidlaw showed the following: Red cells, 5,700,000 per cubic millimetre; hæmoglobin, 100 per cent.; white cells, 8,400 per cubic millimetre; polymorphonuclears, 63·6 per cent; eosinophiles, 7·3 per cent.; lymphocytes, 19 per cent.; large hyaline, 10 per cent. No abnormalities among the red cells. This result did not suggest a general blood disease. The right tonsil was therefore enucleated, under intratracheal insufflation of ether, and an epitrochlear gland removal.

The tonsil is shown, also microscopical sections of the tonsil and of the gland, and these show chronic inflammatory changes only.

Mr. MOLLISON (in reply to a remark by a Member): I would like to mention the enormous help one gets in these cases from intratracheal insufflation of ether. There is no comparison between that and the ordinary chloroform inhalation method. Microscopical section of the trochlear gland and tonsil shows neither sarcoma nor Hodgkin's disease, as suggested, but an inflammatory condition. The question came up in this case whether his occupation as a munition worker was in any way the cause of his condition. I do not think so.

(*December* 3, 1915.)

Two Specimens of Exostosis from the Frontal Sinuses and Ethmoidal Cells.

By H. LAMBERT LACK, F.R.C.S.

(i) THIS large exostosis occupied the whole of the inner end of the left frontal sinus and extended backwards almost horizontally through the ethmoidal region towards the sphenoidal sinus. It was discovered on operation. The patient had a small sinus over the centre of the upper eyelid which led directly to bare bone. I regarded this as a suppurating frontal sinus which had opened itself, although the nose appeared normal and there was no history of nasal trouble. The frontal sinus was exposed through the usual incision and an attempt made to open it over its inner end. In this region nothing but dense bone was encountered and it looked as though no frontal sinus were present. By chiselling over the outer half of the orbit, however, a fair-sized cavity was opened which seemed to be a displaced frontal sinus. It contained pus and the mucous membrane was thickened. The walls of the cavity were entirely removed and the operation completed by removing the whole of the lining membrane and enlarging the infundibulum. The bony mass in the inner half of the sinus was now examined thoroughly and seemed to be growing from the posterior wall of the sinus. It filled the sinus so tightly that not even the finest probe could anywhere be inserted between the growth and the anterior or posterior walls of the sinus. The nasal bones were cut away until the growth was exposed, and it was then found to be loose and easily extracted, leaving a huge cavity. When this had been done and the cavity freely opened into the nose it was found that the sinus septum was perforated and the opposite frontal sinus was full of pus. This sinus was also dealt with by obliteration in the usual way. The patient made an uninterrupted recovery.

(ii) This exostosis was removed some years ago. Half the growth projected into the orbit and two or three attempts had been made to remove it. On exposing the growth thoroughly by a curved incision round the inner angle of the orbit the growth was seen to pass through the inner wall of the orbit into the ethmoidal region. The inner wall of the orbit was accordingly chiselled away until the growth became loose, when it was easily extracted, leaving a large perforation into the nose. This patient also made a rapid recovery.

(*December* 3, 1915.)

Case of Tracheitis Sicca in a Boy.

By H. LAMBERT LACK, F.R.C.S.

THIS patient, a Hebrew boy, aged 7, was sent to me two months ago with marked stridor and considerable dyspnœa of five weeks' duration, for which no cause could be found. On examination I found the trachea obstructed by a mass of large black crusts which seemed almost to fill the lumen. The boy was treated with steam inhalations and a "bronchitis kettle" with no effect. Many days he was kept in bed, and some days he had marked dyspnœa and, according to the parents' account, became cyanosed. I then put him in a nursing home, had his nose syringed twice daily, the throat sprayed three times a day with a Seigle's steam spray, and gave him small doses of potassium iodide. Under this treatment he has greatly improved. There is no stridor nor dyspnœa, but there are still crusts to be seen in the trachea. At no time has the larynx been affected, the voice has always been good, there are no crusts in the pharynx. The nose is rather wide, with a tendency to dryness.

DISCUSSION.

Dr. F. DE HAVILLAND HALL: I would point out the difficulty which sometimes arises in the diagnosis of these cases. Some years ago I was called in to see a patient in consultation, a man, aged about 35, who was suffering from urgent dyspnœa and was very restless. There was very little air entry, and he had marked tracheal stridor. On examining his larynx as well as his restlessness would allow, I found the vocal cords were much congested, but moving freely. I could not get a view of the interior of the trachea. The voice was fairly clear. The urgent symptoms were dyspnœa and some cyanosis. I am bound to say that for some minutes I was staggered for a diagnosis; he had been like that for three days, and I could not find a cause of direct pressure on the trachea. It was only afterwards I thought he had some rhinitis sicca, which led me to expect the possibility of extension to the trachea. He was taken into hospital, and there, under warm alkaline sprays and iodide of potassium and chloride of ammonium internally, he brought up in two or three days an enormous mass of thick inspissated secretion from the trachea. When I saw him he seemed to be in imminent peril of death. Cases of this kind should be reported, because there is sometimes so little to be seen.

Dr. H. J. BANKS DAVIS: I suggest the application of paroleine and menthol with a laryngeal syringe.

Mr. LAMBERT LACK (in reply): I brought the case forward to ask about treatment. The treatment which Dr. Hall has mentioned has been carried out with the exception of giving ammonium chloride, but it has not cured him; he still has crusts, but has lost his dyspnœa. I have had one case which died in almost exactly the same circumstances as Dr. Hall has described. I have seen others, but not another fatal case. The cause of this affection is doubtful; in most cases there has been very little wrong with the nose. In some cases alcoholism seemed probable.

(*December* 3, 1915.)

Papilloma of Larynx in a Child treated under Suspension Laryngoscopy.

By DAN MCKENZIE, M.D.

THE patient, a boy, aged 7, had papillomata removed on several occasions in the usual manner, but always with recurrence, so Albrecht's plan of suspension and curetting was tried. The individual papillomata having been removed, their bases were curetted. The operation took place a year ago, and there has been no further recurrence so far.

DISCUSSION.

Mr. E. D. D. DAVIS: I have done four of these cases recently, and I used a very fine cautery after removing the papillomata with Paterson's forceps, with good results in children. This has been done two or three times, and I have had neither trouble nor recurrence. It has been carefully done under direct vision, and there has been no scarring.

Dr. DAN MCKENZIE: I should be extremely cautious in applying the cautery to the larynx of a child; first because of the reaction, and secondly because of the risk of adhesions and contraction. If a simpler method, such as curetting, is used, the result is as good and it is freer from risk; this method has been carried out in many cases with success.

Dr. JOBSON HORNE: I have used the galvano-cautery in the treatment of papillomata of the larynx in a child aged 12 months and with satisfactory results.

(*December* 3, 1915.)

Long-continued Spasm of the Œsophagus.

By DAN McKENZIE, M.D.

THE patient, a man, aged 27, came to hospital about a year ago complaining of obstruction in the gullet of fifteen years' duration. According to the patient's story the swallowing both of liquids and of solids (or semi-solids) had long been a matter of great difficulty with him. Whatever he took seemed to lodge in his chest, and on most occasions was regurgitated into the mouth and swallowed again. The manœuvres necessary to circumvent the obstacle occupied much time, and it was by no means unusual for him to give up a meal in despair. Indeed, when he was first brought to us by Dr. T. B. Jobson, one of our registrars, he was living entirely upon liquids.

The X-ray picture shows general dilatation of the œsophagus above the cardia, but the screen showed two points at which the bismuth meal was arrested.

By endoscopic examination, the only obstruction found was at, or about, the cardia, where the lumen of the gullet seemed to be sharply crescentic, with the convexity forward. A solid bougie was easily passed under inspection; and, beginning with a medium size, we have gradually worked up to the full size, which, once inserted, is allowed to remain *in situ* for periods of an hour at a time.

The result of the treatment has been encouraging. The patient is able to eat, if not a quick lunch, at all events with some hope of filling his stomach, and his weight has increased by 1 st. in the last two or three months. He is not quite well yet, but we are hoping eventually to obtain a permanent success.

I could see no sign of any ulceration or other disease of the mucous lining, consequently it may be tentatively regarded as a case of spasmodic stricture—what Dr. Hertz has called "achalasia of the cardia." One can now insert the œsophagoscope through the cardiac orifice into the stomach.

DISCUSSION.

Dr. F. DE HAVILLAND HALL: I have had two cases of long-continued spasm of the œsophagus, both of them in medical men, aged 43 and 35 respectively, and both addicted to morphia. In one, the spasm lasted eighteen months; it came on soon after he discontinued the morphia; but, persevering, he recovered fair swallowing power. He again took to morphia, and on discontinuing it he had a recurrence of the spasm. When I saw him he was very much emaciated, and could swallow nothing but milk, and had some difficulty in taking even that. Yet a large-sized bougie passed easily into his stomach. By persevering and keeping him off morphia, he made a good recovery. That was twenty years ago, and when I saw him two or three years ago he was in very fair condition. The other patient, aged 35, also easily allowed the passage of a bougie, yet next day the difficulty in swallowing was as pronounced as ever. This lasted two or three years to my knowledge, and then I lost sight of him. I have wondered whether there are other similar instances on record. The morphia was not taken for the spasm. One of the patients had been my clinical clerk at a hospital, and when I called in to see him he was suffering from acute tonsillitis, and was in great agony. I injected morphia, and he attributed his habit to the delightful sensation so caused.

Mr. MOLLISON: I have recently seen a curious case somewhat similar to this, in a man aged about 38. He was admitted to hospital because of his total inability to swallow. We examined him by the direct method, but found no ulceration or obstruction. Next day he swallowed well, and could swallow full diet. But he came up again in five weeks' time, the doctor saying he was excessively ill; he had become thin and wasted, so that he could scarcely walk into the ward. Again we passed a tube, but found nothing wrong, and this time I left a gastric tube in place for forty-eight hours, and he was fed through it. At the end of that time he swallowed a full meal again, and went out well. Thinking he might be a case of achalasia, I tried passing a mercury-filled rubber tube, but it would not go through the cardia. He may yet develop signs of malignant growth.

Mr. E. D. D. DAVIS: I have seen a post-mortem of an apparently similar case, in which gastro-enterostomy had been done for persistent vomiting. A dilated œsophagus was found and one could get the thumb through the cardiac end. There was no stricture, no mediastinitis and no œsophageal obstruction.

Major KENT HUGHES: A near relative of mine suffered from this condition for many years, but is practically well now. Still, whenever she does too much, or is very tired, the condition recurs. Probably it has to do with exhaustion of the longitudinal fibres, as Dr. Hertz has pointed out. Was there, in this case, a difference between the ability to swallow hot liquids and cold liquids? In the case I speak of, the patient could take warm liquids, but not cold ones.

Dr. DAN MCKENZIE (in reply): The points about morphia and tiredness are exceedingly interesting from a physiological point of view. When the vagi are stimulated the œsophagus contracts and the cardia opens; and when the vagi are paralysed the œsophagus dilates and the cardia closes. That would explain cases which were worse during tiredness, and might explain the cases in which morphia-taking seemed to be the cause. My patient has had obstruction since the age of 12. Several months ago Mr. Hope showed a case in which a similar spasmodic contraction of the œsophagus was found in a child, and it was cured by the passage of bougies.

(*December* 3, 1915.)

Case of Child with Enlargement of External Nose.

By WILLIAM HILL, M.D.

GIRL, aged 8, whose nose has been getting very large for nine months, with rapid increase during the last three months. The bones, as well as the soft parts, are involved in the uniform enlargement, which now amounts to a deformity. No suggestion of an angeiomatous, lipomatous, or other obvious lesion. History of maggots in nose one year ago.

Mr. WHALE: I saw the case a year or more ago, when the mother said maggots were coming out of the nose. I gave an anæsthetic, expecting to find a bead or insect there, but found nothing amiss. I am sure that at that time there was no enlargement of the nose; this must have occurred since.

(*December* 3, 1915.)

Case of Pharyngo-laryngeal Carcinoma.

By WILLIAM HILL, M.D.

MALE, aged 49, with epithelioma of the pharyngo-laryngeal party wall, fullness of the right pyrifossa, and a secondary mass in the right side of the neck. Shown to elicit opinions as to whether the condition was within the limits of radical operative removal.

[Members were agreed that the disease was too advanced for any but palliative measures—e.g., radium or diathermy.]

(*December* 3, 1915.)

Case of Epithelioma of Epiglottis.

By WILLIAM HILL, M.D.

THIS man was exhibited at the Section in March, 1914. The epiglottis was subsequently removed through a large endoscope as thoroughly as possible. The case is now shown to demonstrate the excellent palliative result obtained, although there are now signs of recrudescence of the growth, which had been microscopically proved to be an epithelioma.

(*December* 3, 1915.)

Case of Ulceration of Pharynx.

By GEORGE W. BADGEROW, F.R.C.S.

MRS. O., sent to me at the Throat Hospital, Golden Square, by Dr. K. R. Mehta, of Tooting, in June, 1915. She complained of pain on swallowing. On examination, a white membrane was noticed on the pharyngeal wall and epiglottis; on removal of the membrane the surface was very red and bleeding. On the epiglottis ulceration was noticed in places. The condition remains the same; it does not seem to get worse or better.

DISCUSSION.

Mr. TILLEY: I should not be surprised if the appearances were found to be of factitious origin.

Dr. JOBSON HORNE: If the condition in the pharynx and right ary-epiglottic fold be due to disease, then, in my opinion, the disease is tuberculosis. I have not, however, met with a case of tuberculous ulceration of the pharynx in which tuberculosis of the lungs has not been definitely established.

Dr. H. J. BANKS DAVIS: It looks as if the patient had drunk corrosive fluid or boiling water. I remember a nurse in a hospital who was supposed to have periodical attacks of diphtheria; and whenever she wanted to get away she touched her tonsils with caustic, which produced a diphtheritic appearance.

Laryngological Section.

President—Dr. J. W. Bond.

(*February* 4, 1916.)

Tumour in Region of Right Tonsil and Soft Palate.

By J. W. Bond, M.D.

Patient, a woman, aged 52. A painless swelling in the region of the right tonsil was noticed about six months ago, and it has since increased in size. The fauces are almost completely obstructed by a smooth, round swelling, covered by mucous membrane, and with a definite border all round. The mass is attached on the right side, and extends from the hard palate above, to below and behind the angle of the jaw, where it can be felt externally. Posteriorly it extends to the back of the lateral pharyngeal wall. It is slightly movable. No tonsil proper can be seen.

I think it would be well if we could have more statistics as to the results of operation in this region. We know that the prognosis of epithelioma seems bad, but we do not know as to the prognosis in adenomata, endotheliomata, and the varieties of sarcoma. I think the tumour can be enucleated.

(*February* 4, 1916.)

Extensive Scarring of the Face.

By J. Edmond, M.B.

This patient, a man, aged 27, suffered from ulceration in the region of the nostrils, which began twenty years ago. During the next fifteen years the lesions were twice curetted, and he had several prolonged courses of treatment by Finsen light and X-rays. Five years ago the ulcers rapidly healed after medicinal treatment (presumably by potassium iodide and mercury). Can anything better be done to conceal the deformity?

DISCUSSION.

The PRESIDENT: This seems to be a case of ancient syphilis, with bad damage to the nose. I had a case very much like it some years ago; several operations which I performed did not do much good. Finally, a nose was made from the forehead. It is not necessary to attempt that in this case; I think some plastic operation is possible.

Major KENT HUGHES: I think a good deal can be done for him by lifting up a central portion from the upper lip, and putting an epithelial graft on the other side of that. It makes a very good columella, as pointed out by the late Sir Henry Butlin.

(*February* 4, 1916.)

Foreign Body (Fish-bone) in Œsophagus, followed by Abscess in Neck.

By NORMAN PATTERSON, F.R.C.S.

PATIENT, a woman, aged 44, came to the London Hospital on August 12, 1915, complaining of a pricking sensation on the left side of the throat. She said that two days previously a fish-bone had stuck in her throat. She was examined with the mirror and œsophagoscope—no bone discovered. Next day a fish-bone about 1 in. in length (specimen shown) was brought up. Two days later (August 15) a swelling was noticed in the neck, occupying the position of the left lobe and isthmus of the thyroid. The swelling increased in size, and extended upwards till, by August 20, the whole of the left side of the neck was swollen. On the afternoon of that date, as the patient had some dyspnœa, the house surgeon made an opening in front of the sternomastoid, but failed to find pus. The patient was seen by the exhibitor the same evening, and examination of the larynx showed swelling behind the left arytænoid, some swelling of the arytænoid itself, and impaired movement of the left vocal cord. Under a general anæsthetic a free incision was made behind the sternomastoid, and a large abscess evacuated. A tube was left in for two days. Recovery was rapid and uneventful. The pus contained a variety of organisms.

DISCUSSION.

The PRESIDENT: I wonder where the bone could be when not found by œsophagoscopy or other examination. In recent cases a bone can generally be found; but I always have doubt about cases which have gone on for several weeks; in my experience we do not find them.

Mr. TILLEY: Recently I missed a portion of a pheasant's bone in the gullet. When one gets below the cricoid region, where the œsophagus enlarges, it is easy for a bone to lie in the folds of mucous membrane and to be missed by the œsophagoscope. I withdrew the instrument carefully while watching the posterior wall, and I did not think the bone was there. A pledget of wool was inserted to remove some secretion, when it caught in something, and on removal the bone was adherent to the wool. It is easy to pass the œsophagoscope over a coin in the same region of the gullet without seeing the foreign body.

(*February* 4, 1916.)

Sarcoma of Nasopharynx and Cervical Glands; Result of Treatment.

By NORMAN PATTERSON, F.R.C.S.

THE patient, a woman, aged 39, came to the Hospital for Diseases of the Throat, Golden Square, in July, 1913, complaining of discharge of mucus and blood from the nose and throat, and inability to breathe through the nose. The whole of the nasopharynx was filled by a mass of new growth which projected nearly down to the free edge of the soft palate. It was soft to the touch and bled profusely after digital examination. There was some enlargement of the glands in both anterior triangles.

September, 1913: The patient was referred to Dr. Sequeira for X-ray treatment. After six applications through the mouth the growth had entirely disappeared. At a later date a tube of radium was inserted into the post-nasal space, although by this time the tumour had completely vanished. In spite of eight applications of X-rays to the neck, the glands continued to enlarge. Operations on the neck were carried out on the following dates:—

June 26, 1914: Dissection of right anterior triangle.

July 29, 1914: Same procedure carried out on the left side. On this side there were enlarged glands deep to the sternomastoid, which were removed after section of the muscle.

February, 1915: An enlarged gland had appeared on the right side above the clavicle. A thorough dissection was made in this neighbourhood after turning outwards a triangular flap of skin; one incision was made along the line of the clavicle and the other down the anterior border of the sternomastoid.

Microscopic examination of one of the glands showed mixed-celled sarcoma. Unfortunately, owing to the absence of Mr. Gillies, the slide cannot be found.

Since the last operation the patient has had several applications of X-rays. There is now no sign of recurrence.

The patient is somewhat deaf on the right side. There is a history of discharge from the right ear in 1912, which lasted a week.

The PRESIDENT: The result in this case seems to be a very happy one, owing to the utilization of the various forces which we now have at command. At one time such cases would have been left alone.

(*February* 4, 1916.)

Partial Excision of the Thyroid Cartilage as an Alternative to Thyrotomy in Malignant Disease of the Vocal Cords.

By H. LAMBERT LACK, F.R.C.S.

THE patient, a man, aged 55, had an epithelioma involving the greater part of the right vocal cord, only the extreme ends being free. The specimen and microscopical section are shown; also a larynx dissected to illustrate the method of operating.

The larynx and trachea were exposed through the usual median incision and a Hahn's cannula inserted. The right ala of the thyroid cartilage was exposed and the perichondrium detached from its lower half. The thyroid cartilage was divided in the median line, as in thyrotomy, and then the shears were turned at right angles so as to split the right ala horizontally about its centre. The soft parts of the larynx were carefully divided in the median line in front, and then the incision was carried backwards through the ventricle of the larynx. This incision, being held open with retractors, gave a good view of the growth and it was extended through the crico-thyroid membrane and the mucous membrane of the larynx well below the growth. The quadrilateral flap, consisting of the lower half of the right ala of the thyroid with the vocal cord attached, was now bent firmly outwards. This gives a much better view than is presented by thyrotomy and allows greater facilities for removing the posterior part of the cord, and for arresting the bleeding which is often troublesome at this stage.

I performed this operation in my earliest thyrotomies, but subsequently adopted the usual method. Latterly I have reverted to it. In my opinion it has many advantages. Better access means an easier, more rapid, and more thorough operation. The removal of the underlying cartilage certainly aids in thoroughness. The easy control of bleeding means less trouble with the anæsthetic and less danger of blood entering the lungs. Should packing of the wound be considered necessary, it is much easier to introduce it and later to remove it. It does away with the necessity of splitting the thyro-hyoid membrane and the violent pulling apart of the two halves of the thyroid which often leads to much subsequent discomfort and difficulty in swallowing. In my next case I intend to go further. I shall try not to split the thyroid cartilage in its whole extent, but to leave a small piece in the middle line quite at the top (*see* specimen shown). In this way the operation, although more thorough than thyrotomy, will be as simple and as free from danger as tracheotomy. Moreover, if the growth crosses the middle line in front, it can still be removed in one piece without cutting into it, this advantage was emphasized in my original account of the operation.[1] In that paper the risk of cell transplantation from cutting into a growth, and the advantages of avoiding it, were especially considered. Also, occasionally, the bared piece of cartilage necroses and leads to considerable delay in healing. After this operation healing seems to take place more quickly.

With regard to the voice, I think the results may be even better than after thyrotomy. If the soft parts are removed right down to the cartilage one cannot expect much granulation tissue to spring up, and in some of my cases a large gap has resulted, with a very poor voice. After removal of portions of the cartilage and, in one case, of half the larynx, a better voice has been obtained than is usual in thyrotomy, and in much less time. Members may remember the historical case of Montagu Williams, whose voice after hemi-laryngectomy was so good that there was thought of his returning to the Bar, and he did fulfil his duties as a police magistrate for several years subsequently. I expect, therefore, this method to yield better ultimate results than thyrotomy.

---

[1] *See Lancet*, 1896, i, p. 1638.

DISCUSSION.

The PRESIDENT: Twenty-two years ago Mr. Lambert Lack helped me with a laryngeal case, when I removed a large part of both thyroid plates, leaving the posterior and superior borders. I also removed the cricoid. I am glad there has been a development of this operation of laryngo-fissure or thyrotomy. At a late meeting I stated there was difficulty in obtaining a proper view of the diseased part in these cases. The operation now described by Mr. Lack will give one a better view of the region from which the growths spring, and especially of the posterior part. Mr. Lack also mentions the risk of cell transplantation due to cutting into the growth, and I am sure that is a decided risk. Of late years in these cases I have always used the actual cautery, because one gets the knife and the wound tainted, and cauterizing the wound lessens the risk of recurrence.

Sir STCLAIR THOMSON: I think Mr. Lack's object is a very worthy one, because, as we said in a debate here not long ago, one difficulty of laryngo-fissure is getting to the posterior end of the cord, both for seeing and for dissecting it off, as well as for dealing with possible hæmorrhage. And, as I mentioned at the time, I sometimes get a better opening than some of my colleagues, by semi-dislocating the larynx on to the spinal column in order to be able to look at it sideways and lift one of the alæ. By so doing, I have not had such great difficulties as one would imagine. Mr. Lack's suggestion is only suitable in certain cases. Anyhow, it is not suitable for cases which go across the middle line, unless one is prepared to take a bit of the thyroid cartilage on the opposite side. And it is difficult to know, before you have split the larynx and opened it as widely as possible, what is the extent of the growth you may have to deal with. So I do not regard this as an "alternative" to laryngo-fissure; it can only be an "addition." I think it wise to split the larynx first, because no method of laryngoscopy ever tells one exactly the extent of the growth. In some of these cases I have had to pare off the growth into the subglottic region, and although these cases generally show that the growth is too far gone, still, I have had two cases in which I have had to split the cricoid cartilage in order to get into the subglottic region, and the patients have lived for years afterwards. The simpler an operation is, the more perfect it is likely to be; and it is only when new that operations are complicated. At the beginning laryngo-fissure was complicated by many things which we have now got beyond. There is the Hahn's tube, which Mr. Lack still uses. I have used it, but I am glad I said "Good-bye" to it ten years ago, because it was a very unsatisfactory method of cutting off the blood from the lower air-passages. It had to be carefully prepared with a sponge, which was very difficult to keep aseptic; moreover, one had to wait for it to dilate and so block the trachea. The only case of pneumonia I ever had was after one of these tubes had been used. By the simpler method of packing with gauze or a sponge from above, one can be absolutely certain that no blood goes into the lung. During the last ten years I have had no trouble with these cases, excepting in one in which there was difficulty of swallowing; all the other patients could swallow in twenty-four hours. The exception was the case of a man, aged 68, who had sclerosed arteries and was alcoholic, and he had to be fed through the nose for ten days. This method of Mr. Lack's, though very elegant and giving a view far back, would still entail the splitting of the thyroid cartilage at the top if one wished to go as far above and below as might be necessary. Therefore, though it might be suitable for some of the more limited cases, those are just the cases in which one would not require it.

Mr. TILLEY: I have not practised the operation now under discussion; but one gathers from the demonstration that there are advantages in connexion with it when the growth is small and limited. It would be possible to remove a small nodule on the cord in this way. But in each case upon which I operate I feel more and more strongly that we cannot take away too much of apparently healthy tissues around the cancer. In my last patient I cleared out all the tissues, from the top of the thyroid to the cricoid ring, though the growth was only a small nodule. I am quite prepared to hear someone say that was unnecessary, but the proof will depend on the after-history of a series of such cases. At the last meeting I showed a case of recurrence, seven years after the primary operation; the nodule was situated in the lower part of the remains of the ventricular band, which had been left at the operation seven years previously. Now if I had taken the precaution to remove the apparently healthy tissue from the whole inner surface of the thyroid, probably there would not have been a recurrence. Mr. Lack's procedure seems to me to be well conceived, and it might be applicable to a small growth; but if I adopted the method I should take out the whole side of the thyroid cartilage, and should not limit it to a small window. I hold this opinion as the result of some experiences in recurrence after the lapse of a long period of time—e.g., thirteen and fifteen years after the primary operations. I do not think you can make too wide a removal of tissue in these laryngeal cases or in cancer in any other region. With regard to Hahn's cannula, I use it merely as a convenient form of tracheotomy tube, but it has no sponge coating, and when inserting it I pack a long strip of gauze above it and proceed at once with further steps in the operation.

Dr. BROECKAERT, of Ghent (speaking in French): Two years ago for the first time I demonstrated in Paris a method which is somewhat between a thyrotomy and a hemi-laryngectomy. One striking thing about the two cases was the ease of the post-operative treatment. I bring the skin over, and close the wound at once. I introduced it to Dr. Moure, of Bordeaux, who was satisfied with it and carried it out. I also introduced it to a Dutch colleague, Dr. Quix, who modified it slightly by turning in a flap of skin from the side, so as to line it with a graft. I call it a window excision of part of the larynx. It is very important to leave the upper and posterior borders of the thyroid wing, a point which makes the great difference between this operation and hemi-laryngectomy, which I, like others, have found to be an even more fatal operation than complete excision of the larynx.

Dr. KELSON: I would like to ask Mr. Lack one question. He says in his notes: "I performed this operation in my earliest 'thyrotomies,' but subsequently adopted the usual method." I ask why he abandoned that method.

Mr. LACK (in reply): I am sorry I mentioned Hahn's cannula. I pointed out in the *Lancet* twenty years ago that it was impossible to rely on it, and that it was necessary to pack the trachea above it. This has invariably been my practice, although I still generally use a Hahn's cannula, as it is convenient for the anæsthetic. The criticism of Sir StClair Thomson and Mr. Tilley is based upon a misapprehension, perhaps because in the specimen I dissected only a very small window is cut. In my description, I state that all the cartilage which in the usual operation of thyrotomy is laid bare by removing the mucous membrane inside the larynx, should be cut away. The amount of cartilage removed corresponds with the amount of soft parts removed, and this may be as extensive as the operator desires. As Professor Broeckaert showed, the whole thyroid cartilage, with the exception of the upper edge and the posterior edge, may be removed as well as half the cricoid. The removal of the cartilage, by giving better access, allows a more thorough operation and the removal of a more extensive growth than a simple thyrotomy. Whether or not it is advisable to split the thyroid as a preliminary does not affect the principle of the operation, which is the removal of the cartilage as well as the soft parts.

(*February* 4, 1916.)

Total Laryngectomy for Cancer, Three Years after Operation.

By DAN MCKENZIE, M.D.

THE patient was shown before the Section on March 7, 1913. The operation took place on January 12, 1913, having been preceded by tracheotomy fourteen days before. Novelties in the technique consisted, first in the treatment of the trachea, the upper end of which, after division, was closed with catgut sutures while the tracheotomy tube was left in the tracheotomy opening. Three weeks after operation the upper end of the trachea began to gape, and the tracheotomy tube was removed from the tracheotomy opening and inserted into the upper end of the trachea, allowing the tracheotomy wound to close.

The interval during which the upper end of the trachea remained

---

closed was that during which wound discharges are most liable to cause pulmonary complications. It is to this precaution that the rapid apyrexial recovery of the patient is attributed. There is now, three years since the operation, no sign of any recurrence. The cervical glands, none of which could be felt on palpation, were not removed.

The PRESIDENT: Would it not be practicable to insert a tube upwards, and so improve the voice?

(*February* 4, 1916.)

Leukoplakia of Vocal Cords.

By HERBERT TILLEY, F.R.C.S.

THE patient is a stout, healthy-looking male, aged 52. He complained solely of hoarseness, but in reality it was a gruffness of his normal voice. No history of syphilis. Wassermann reaction negative. On the right side of the tongue there was a small smooth patch suggestive of chronic superficial glossitis. No other stigmata of syphilis in the throat or elsewhere. The vocal cords were slightly congested but freely movable. From the middle of the upper surface of each cord, and extending to within ¼ in. of the anterior commissure, a dead white patch could be seen, in appearance identical with the plaques seen in a leukoplakic tongue. The surfaces of the plaques are flat, and there is no suggestion of ulceration, thickening, or infiltration of the cords in the neighbourhood of the white patches.

The fact that both cords are affected, and that they are normal in the immediate region of the anterior commissure—i.e., that the plaques are not continuous—would seem to negative the idea of their being an early stage of epithelioma, and the term "leukoplakia" has been given because the appearances are so like that condition when seen on the tongue.

DISCUSSION.

The PRESIDENT: There is more growth on the left cord than on the right, and an interval between without growth; there is some flagging of the left cord, and there the growth goes down some distance. The diagnosis seems to rest between malignant disease and tubercle. At present no one can say what it is with certainty, and the case must be watched.

Sir StClair Thomson: I should not like to make a diagnosis. The cords are abraded, and one may be ulcerated; and there is on both of them this white sloughy membranous secretion, which Mr. Tilley says he has brushed off and it has returned. It may be some infection from the nose or some local suppurative infection. As it is on both cords, tubercle seems more probable than malignant disease.

Mr. Stuart-Low: I had a case like this sent to me from South Africa; the patient had the same condition on one vocal cord. The late Sir Henry Butlin once sent round some statistics relating to the spread of infection from one cord to the other, and asked us to give him details of our experience of the process.

Mr. Tilley (in reply): I show the case here because I do not think I have seen one exactly like it before. The man is strong, stout, and perfectly healthy. He has no physical signs of tubercle, and there is no history of syphilis; the Wassermann test is negative. Beyond the slight gruffness of his voice, which he has had for eighteen months, there is no other symptom. On the right side of the tongue we found a smooth patch which suggested chronic glossitis, and he has therefore been having, since December 4, 10 gr. iodide of potassium three times a day and $\frac{1}{16}$ gr. of perchloride of mercury in solution. He says he is better, and that his throat and voice seem better; but I cannot detect any difference in the laryngeal appearances. I show him because of the possibility of early malignant disease. While he has been under my care I have had under my notice a medical man whose somewhat similar laryngeal appearances have puzzled me very much; but they were limited to the right vocal cord. Some fifteen years ago he suffered from a digital chancre, and two years later I saw him with a gumma under his right Eustachian tube. Six years after that, in spite of different courses of treatment, he comes with this patch on the right vocal cord, which I took to be a recrudescence of his old trouble. But injections of grey oil and iodide of potassium internally did not result in its disappearance. I wondered whether it was early epithelioma. The condition disappeared after a week's vocal rest. The patient shown to-day cannot take a week's vocal rest. I could not convince myself that there was any deficiency in the movement of the left vocal cord. I think I shall let the case run a little longer, keeping an eye on him; and if I find any sudden increase in size of the patch, or evidences of infiltration, I shall operate at once. In answer to Sir StClair Thomson, I have rubbed that patch twice with nitrate of silver, and it is adherent. I do not think it could be wiped off or that the epithelium could be removed with forceps.

(*February* 4, 1916.)

Case of Hypopharyngeal Carcinoma ; Removal ; Restoration of the Wall by turning in a Piece of Skin.

By W. M. MOLLISON, M.C.

E. L., FEMALE, aged 39, attended Guy's Hospital on account of difficulty in swallowing. This symptom had been present for about four months and had increased in severity, till on admission to hospital she was unable to swallow fluids except with much difficulty.

Examination with a Hill's tube demonstrated a characteristic ulcer in the hypopharynx, occupying the posterior surface of the cricoid and extending round the right lateral wall on to the posterior pharyngeal wall, but fortunately leaving a small strip of normal mucous membrane on the left side. There were no glands to be felt in the neck. Operation was decided upon, as the patient had a long, thin neck and seemed a fit subject; her general condition was fairly good.

December 4: Dr. Shipway kindly administered ether by intratracheal insufflation ; this was undoubtedly a most important factor in determining the success of the operation ; it removed all anxiety as to blood entering the larynx at any stage. Mr. Trotter's method of approach was followed (*see* Hunterian Lectures, 1913). After removal of the ulcer there was a strip of mucous membrane left, only ½ cm. broad, lying on the left postero-lateral wall. A piece of skin was then freed from the tissues overlying the sternomastoid opposite the gap left by the removal of the ulcer, and was sutured to the strip of mucous membrane. A rubber tube was passed from the mouth to the stomach and kept in position for some days; it was then removed and passed from the neck wound instead.

January 23 : The second part of the operation was performed. The base of the skin flap was divided, turned in at the back of the cricoid, and sutured to the far side of the mucous strip. The rubber tube was passed from the mouth through the new piece of gullet and kept in place three days. At the end of that time the patient could swallow normally without any leakage through the wound.

The wound is barely healed, but she is more comfortable than she has been for many months.

A preparation of the ulcer is shown.

DISCUSSION.

The PRESIDENT: We are glad to see cases of this rare operation, and hope this case will be more successful than the original series reported by Mr. Trotter. No cure was recorded in his five cases. I should like to see this patient again at the end of a year, if she is then alive.

Dr. DUNDAS GRANT: Mr. Waggett showed a similar case here one or two years ago, and I do not think he reported any recurrence in it. I do not think he turned in a flap of skin, a very admirable part of the operation in this case. I am particularly interested in this condition, because it was I who suggested it should be made a subject of discussion at the last International Congress—i.e., post-cricoid carcinoma. It had been forced upon my attention by the fact that I had seen several cases in remarkably young women, a surprising fact considering that we had been brought up, as it were, on the idea that carcinoma of the larynx in women was very rare. It has now become a very important chapter in laryngeal surgery. Such cases as this encourage us.

Mr. CYRIL HORSFORD: I have a similar case of pharyngeal cancer, in the lateral wall, very early and limited, except that it is now beginning to encroach on the larynx. There is no palpable gland, and I thought it would be suitable for Mr. Trotter's method of lateral pharyngotomy. But the prognosis in this class of case is so bad that one hesitates before advising such a severe operation. I ask whether, after his experience, Mr. Mollison can say my case is likely to be capable of being dealt with satisfactorily by his method.

Mr. MOLLISON (in reply): I brought the patient forward so soon after operation because of the interest of such cases, and to emphasize the comparative ease of the operation under intratracheal insufflation of ether; this does away with the necessity of tracheotomy beforehand, and the tube in the larynx does not get in the way after opening the pharyngeal wall. I dissociate these hypopharyngeal cases from pharyngeal cases; they are usually women between 35 and 40 years of age. I undertook the operation in this case because the history was comparatively short—only four months—though doubtless the ulcer had been there some time previously; also she had a long thin neck, which made the operation comparatively simple. I followed Mr. Trotter's method, as described in his Hunterian Lectures, but found I had to remove the lateral lobe of the thyroid gland to get low enough to reach the lower edge of the ulcer. Then one could remove the whole wall of the hypopharynx and strip it off the back of the cricoid, leaving only a narrow strip of mucous membrane to make continuity of the upper with the lower parts. The turning in of the skin was comparatively easy; when it was fixed in position a tube was passed from the mouth through the œsophagus to the stomach; on its removal at the end of three days the junction was quite water-tight, and at no time since the operation has any food come through.

(*February* 4, 1916.)

Plastic Operation for Nasal Stenosis.

By W. Stuart-Low, F.R.C.S.

Patient, a soldier, wounded at the battle of Ypres four months ago, received a very severe injury to the nose, which was quite flattened, the bones of the septum being crushed and the alæ forced down flat. He underwent repeated operations in the military hospitals in order that a nasal passage might be re-formed, and when he was sent to the Central London Throat, Nose, and Ear Hospital, the anterior nares were quite obliterated by cicatricial compression. Moure's operation was performed. The right ala having been freed and the soft structures towards the inner canthus turned up, passages were then bored out in the flattened tissues, and a long inner tracheotomy tube placed in them. This was found very useful indeed in maintaining the opening, as its flange prevented it passing in too far. Soft catheters were then passed twice daily into the passages and nasopharynx and out at the mouth, and these were pulled see-saw fashion for five or ten minutes at a time. The catheters were greatly enlarged, and now No. 12 is used. This was found very effectual in maintaining and enlarging the passages, which are now good. He can breathe quite freely, even at night.

(*February* 4, 1916.)

Nasopharyngeal Fibroma.

By F. A. Rose, F.R.C.S.

A boy, aged 12½. A swelling has been noticed in the left cheek for seven months. There has been bleeding from the nose upon about twenty different occasions. A smooth, firm, rounded tumour fills the left side of the nasopharynx and the posterior part of the left nasal fossa. A portion of the growth projects below the malar bone. The left eye is proptosed.

DISCUSSION.

The PRESIDENT: I suppose the question here is as to the best method of approach. I am not now so inclined to use the mouth operation as I used to be. In this case I would do something like Moure's operation as a beginning, and then go farther down if necessary, from the upper part of the maxilla and through the alveolar process, so as to get a good exposure of the growth through the front of the face. It may be possible for Mr. Rose to operate through the mouth and secure a good result, though I doubt it. We could not very well palpate the growth to define its limits posteriorly.

Dr. KELSON: It is doubtful whether it is a simple nasopharyngeal fibroma. It seems more like certain malignant cases which one sees.

Dr. JOBSON HORNE: I attach importance to the site of origin of the growth being determined before its removal. So far as I have been able to examine the case the growth appears to me to be antral and not nasopharyngeal in origin.

Dr. KENT HUGHES: I palpated this case in the hospital and I do not think it is naso-pharyngeal; I think it arises from the antrum. It is prominent in the nose and adherent to the septum and turbinate; there is proptosis and a fullness above the zygoma. I doubt whether it is simple fibroma.

(*February* 4, 1916.)

Plumbism and Pyorrhœa associated with Passive Œdema and Thickening of the Uvula, Epiglottis, and Arytænoids, with Enlargement of the Glands in the Parotid and Submaxillary Regions.

By JOBSON HORNE, M.D.

THE patient, a man, aged 57, is a sanitary fitter. For thirty-one years in this occupation he has been working with red and white lead and paint.

On September 1, 1915, he came to the Metropolitan Ear, Nose, and Throat Hospital on account of deafness, and mentioned that there had been some "swellings in the neck." Eighteen months previously he had attended on account of "closing of the throat." At that time it was noted that the uvula was enlarged and the arytænoids were œdematous, but no enlargement of the glands was recorded. Upon further inquiry it was ascertained that he had had similar throat symptoms at intervals before his first attendance at the hospital.

Towards the latter part of November, 1915, there was a recurrence of the "swellings" about the neck, and in January of this year he attended again at the hospital. There were then, on the left side, three obvious swellings, one over the parotid and two at the angle of the jaw, of the size of damsons, discrete and free from pain or tenderness; another and similar swelling, but less obvious, was symmetrically placed over the right parotid region. The teeth and gums were in a very unhealthy condition—tartar, pyorrhœa, gingivitis, together with a faint blue line. The uvula was enlarged almost to the size of the tip of a little finger, the epiglottis was considerably thickened, obscuring a complete view of the larynx, but the arytænoids were seen to be enlarged. The voice was natural, but there was some difficulty in swallowing. Twenty-one years ago the patient was laid up for thirteen weeks with pneumonia. Examination of the lungs and heart yielded nothing abnormal. There was no sputum and no cough. There was no history of any specific disease nor of tuberculosis. There were no enlarged glands palpable other than those mentioned. The glandular enlargement was probably due to local causes. The treatment given was quinine (1 gr.) and iodide of potassium (5 gr.) thrice daily, and a mouth-wash of peroxide of hydrogen. Within ten days there was instantaneous and marked improvement, the "swellings" rapidly subsided, and the patient expressed himself as feeling decidedly better.

DISCUSSION.

Mr. CLAYTON FOX: I think it is probably primary tuberculosis in the upper deep cervical and parotid lymphatic glands. The condition of the uvula is certainly not tuberculous, but there is some infiltration of the epiglottis without œdema. I regard the œdema of the uvula and arytænoids as secondary to lymphatic obstruction.

Dr. DONELAN: I noticed that the œdema of the epiglottis has almost disappeared, doubtless as the result of treatment. The œdema of the uvula and the glandular enlargement are still present. I was unable to detect any evidence of tuberculosis in the larynx.

Dr. JOBSON HORNE (in reply): The possibility of the lesions being due to tuberculosis has been kept in mind, but so far no clinical evidence has been obtained to support the suggestion. Moreover, as there has been such a remarkable subsidence in the glands and reduction in size of uvula and epiglottis after ten days of treatment with iodide of potassium (5 gr.) internally and peroxide of hydrogen as a mouth-wash, I am all the more inclined to associate the condition with plumbism.

(*February* 4, 1916.)

Case of Intense Dryness of the Mouth, associated with Ulceration of the Pharynx.

By CECIL GRAHAM, F.R.C.S.

MRS. M. J., aged 46, noticed loss of voice, suddenly, towards the end of November, 1915. She had had pneumonia four months previously, but had been well during the interval preceding the loss of voice. She has no moisture in the buccal cavity, the mucous membrane being perfectly dry; and superficial furrows are seen on the tongue which are formed by the papillæ and which do not extend into the substance of the tongue. The pharyngeal wall is coated by sticky mucus, and shows superficial ulceration from the nasopharynx to the arytænoids. The vocal cords are pink and fleshy, and their close apposition is prevented by interarytænoid thickening. The left nasal fossa is clear, and the maxillary sinuses are translucent, but there is some inspissated secretion, small in amount, in the right middle meatus.

DISCUSSION.

Dr. DUNDAS GRANT: I think the condition of the larynx is secondary to the nasal suppuration, the swelling in the interarytænoid space being due to infection by the inhaled pus. The vocal cords are red rather than infiltrated: that may be secondary to the dry mouth and to the crusts in the nose. I do not know what is the cause of the dryness of the mouth.

Dr. KELSON: I think this patient's water should be examined; the case reminds me of appearances seen in diabetes.

Sir STCLAIR THOMSON: The appearance suggests that something has been going on for some time, because in the interarytænoid region there is that chronic hypertrophy which is generally associated with the descent of pus from the nose or with a late syphilitic manifestation.

The PRESIDENT: This afternoon Mr. Graham has received an intimation that the Wassermann reaction is positive. There has doubtless been purulent rhinitis for years and a secondary atrophic rhinitis with descending atrophic trouble.

(*February* 4, 1916.)

Chronic Syphilitic Laryngitis with Marked Stenosis.

By WILLIAM HILL, M.D.

MAN, aged 30. Primary syphilis was contracted ten years previously. Severe tertiary ulceration and deformity of the larynx one year ago, necessitated tracheostomy. Portions of hyperplastic tissue have been freely removed through an endoscope, but stenosis has speedily recurred. Patient cannot breathe well through an ordinary intubation tube, showing that the upper end of the trachea is also stenosed. It has been found impracticable to use a Schimmelbusch apparatus through the present ordinary tracheotomic orifice, and in view of the syphilitic nature of the lesion, with the tendency to contraction, the exhibitor has hesitated to resort to any further cutting operation. Suggestions are invited as to any other treatment.

Dr. DUNDAS GRANT: I suggest he should try Thost's dilators, which are passed from below upwards. The horizontal limb of the plug goes underneath the tracheotomy tube; they are graduated and can be used one after the other. Possibly after reopening the larynx one could again do the laryngostomy.

(*February* 4, 1916.)

Lupus of the Mouth and Throat.

By W. KENT HUGHES, M.B.

IN this patient, a girl, there is a large nodule on the side and under surface of the tongue divided into two by pressure upon the second left lower bicuspid. The under surface and extremity of the tip have now a granular surface, but until recently were occupied by a large flat nodule. The left side of the lower jaw is extensively involved in the region of the molars and second bicuspid. The epiglottis has almost disappeared, but the disease in this region is quiescent.

I am not responsible for the diagnosis of lupus; the case was sent to me by Mr. Harmer. Lupus is about the only pest which does not flourish in Australia; I have not seen an instance there. Five years ago the woman had occasional loss of voice, and four and a half years ago she noticed that her epiglottis was affected, next the lower part of the base of the tongue, then the tip of the tongue, lastly the jaw. Three years ago she came under Mr. Harmer's care, and he gave her tuberculin, which improved the larynx and base of the tongue, but had no effect on the anterior side of the tongue or the jaw. Then 60 gr. sodium iodide by ionization was tried, twenty applications, and she has had forty applications of the Simpson lamp. That was last November, and I did not see her again until a fortnight ago, when she was steadily becoming worse; therefore I decided to try the effect of Spengler's I.K. therapy. I have had only a small experience of that treatment, but it has been so striking in the person of my wife that it seemed worth trying in this case. Spengler advised it in lupus and tubercle, and the result has been most surprising in a fortnight, the tongue condition having half cleared up in that time, and the girl eats better and feels improved in every way. On testing by Spengler's precipitation test, which he admits is only a rough-and-ready method, an enormous improvement in the patient's resistance is seen. I am grateful to Miss Francis for the trouble she has taken in carrying out this test for me. My wife's case was a most striking one: she had been "going down hill" for seven years, and at one time had twenty bacilli per field (that was last October); now she has only one bacillus in five fields, she is putting on weight, and in the last ten weeks her temperature has only once been above the normal.

DISCUSSION.

The PRESIDENT: With regard to lupus of the throat, nose, larynx, and so on, in my experience one falls into the pit now and then if one fails to have a Wassermann test carried out and carefully done. I have seen many cases diagnosed as lupus when the condition was syphilis, and vice versa.

Major KENT HUGHES: Wassermann's reaction was negative.

Laryngological Section.

President—Dr. J. W. BOND.

(*March* 3, 1916.)

The Histological Features of Rhinophyma (Epidiascopic Demonstration).

By Sir WILLIAM MILLIGAN, M.D.

MALE, aged 58. The enlarged and lobulated appearance of the nose has existed for years. He has been troubled with chronic acne rosacea of the face for some time past. He drinks beer, but not in excess. The heart, lungs, and kidneys are normal. Cases of rhinophyma are not rarely seen, but are not often operated upon, because they are thought to be very vascular. Yet, although some of my cases have been vascular, the bleeding has never been enough to worry about. The exact ætiology is not known. Some pathologists consider that a rhinophyma is a soft fibroma of the skin, others, that it is the result of an angio-neurosis, others, again, that it is the terminal result of acne rosacea. Ollier calls it "elephantiasis des buveurs" because he has found it to occur amongst those who drink very freely. That has not been my experience. I think it is the result of acne rosacea, and in one or two of my cases the disease has been present in other parts of the body.

Lantern slides of the patient's appearance before and after operation are shown. One can see the openings of very large sebaceous glands, and there is always a quantity of sebum upon the skin. This man has had rhinophyma a number of years, and came to the Royal Infirmary, asking whether anything could be done for him.

I made an incision down the centre of the dorsum of the nose and two lateral incisions round the side of the nose, and partly with a very sharp knife and partly with a very sharp razor stripped all the lobulated and hypertrophied tissue from the side of the nose, being careful not to injure the cartilages. During the dissection the nose was kept plugged with pledgets of wool to keep it distended. A skin-graft was taken from the patient's leg, to cover immediately the whole raw surface. I then covered the graft with gold leaf and put on a simple dressing, fixed it with plaster, and left it there five days, when it was found that the graft had taken completely.

Histology.—The surface epithelium is intact, and in most places not thickened at all. The main thickening occurs in the subcutaneous tissue, where there is considerable hypertrophy. Many of the sections show a deposit of fat in the subcutaneous tissue. There is an interstitial hyperplasia, the blood-vessels are enlarged as also are the lymphatics, and there is an enormous dilatation of the sebaceous glands—to four or five times their normal size. Some observers say they are also increased in number. The lobulated condition is due to thickening of the subcutaneous tissue. I think the condition should be operated upon because it is so unsightly. I have not seen a case in a female, though I believe cases have been recorded.

DISCUSSION.

Mr. DAWSON: I show a photograph of a man on whom I operated a few years ago. He was aged 73. The condition begins suddenly, with flushing of the nose, which is first temporary, and then becomes permanent, and hyperplasia occurs round the blood-vessels. There is a hyper-development of the sebaceous glands, so that instead of being about $\frac{1}{8}$ in. in depth, they are $\frac{1}{2}$ in. to $\frac{3}{4}$ in. deep. I think skin-grafting is not necessary in these cases: if some true skin is left, there will be no scar; there was none in my cases.

Dr. WILLIAM HILL: Captain Cope operated upon such a case of acne rosacea, and he used a razor and simply shaved off what he judged to be a sufficient amount of tissue, leaving enough for a normal-sized tip. He did not graft, but simply used a little plain water dressing. He did not meet with much bleeding, and what there was could be dealt with by pressure. Mr. Dawson's photographs bear out what can be done without skin-grafting.

Major KENT HUGHES: Recently I had a similar case, but a little more aggravated in degree. There were three lobes, two of which seemed to belong to the same growth; that on the right side was separate. I operated only on the right side. There was no excess of sebum on the skin. I was not forced to skin-graft, because I could get enough skin from the root of the tumour to restore the shape of the nose on that side. I put in a few stitches and sent the patient home. I employed local anæsthesia. The operation was done about three weeks ago.

Dr. WATSON WILLIAMS: It will be interesting to learn the later history of this case, especially as to whether the use of part of the skin for the graft has led to recurrence. The result obtained by Sir William Milligan after skin-grafting with healthy skin from another region is so admirable that it tempts one to employ the same measure, and one feels that grafting must expedite recovery when so considerable an area has to become covered.

Mr. E. D. D. DAVIS: The late Mr. Stanley Boyd operated on a number of these cases by shaving the redundant tissue with a razor, and he described it as like paring a pear. His results were fairly good. I had such a case five years ago. I made an incision parallel with the edge of the nostril and over the bridge of the nose, and after removal of the growth stitched with horsehair. The case was very satisfactory. The patient was a publican. I saw him three weeks after the operation, but not since, so I cannot say whether there has been any recurrence.

Dr. KELSON: What anæsthetic was used? It is an important point, because these patients in many instances have visceral disease. The tissue removed is very insensitive, for a surgeon told me he had operated upon several without any anæsthetic, and the procedure was borne very well.

Sir WILLIAM MILLIGAN (in reply): I do not lay great stress on skin-grafting, but I think it expedites the healing process, and may be a factor in preventing recurrence. I do not agree with making use of the skin in the immediate locality, because it is difficult to tell whether the hyperplastic process is not tracking along the subcutaneous tissue. I have not always skin-grafted in these cases; sometimes I have simply shaved off the hypertrophied tissue. The anæsthetic used was, I believe, open ether, followed by chloroform.

(*March* 3, 1916.)

Two Cases of Removal of a Fish-bone from the Larynx in Adult Females.

By Sir WILLIAM MILLIGAN, M.D.

Case I.—Patient, a female, aged 48. She inhaled the fishbone during a meal. There was a severe fit of coughing and slight blood-stained expectoration.

Case II.—Patient, a female, aged 30. The same history as in Case I.

DISCUSSION.

Dr. DUNDAS GRANT: I should like to know how the large bones were lying in the larynx.

Sir WILLIAM MILLIGAN (in reply): The larger fish-bone was lying across the larynx, more or less embedded in swollen mucous membrane. It had been in the larynx five or six days. The small fish-bone was lying turned up under the left false vocal cord, with the point embedded in the mucous membrane of the opposite side of the larynx.

(*March* 3, 1916.)

Three Foreign Bodies removed from the Bronchi by Upper Bronchoscopy.

By THOMAS GUTHRIE, F.R.C.S.

(1) *Piece of Mutton-bone.*—A boy, aged 10, while eating his dinner, was seized with a violent fit of coughing which subsided after a few minutes. Two days later there were rise of temperature, cough, and expectoration, and signs of pneumonia gradually developed in the left lung. Nine days after the accident, upper bronchoscopy under general anæsthesia showed the bone lying in the left bronchus about ⅓ in. from its orifice. Removal by means of Brünings's forceps was followed by rapid recovery.

(2) *Piece of Metal Pencil-case* (with radiogram).—The patient was a boy, aged 11. A piece of a broken pencil-case had been inhaled on the previous day and lay with its hollow end upwards in the branch of the main bronchus leading to the lower lobe of the right lung. The only difficulty consisted in the fact that on grasping one edge of the object with Brünings's forceps its opposite sharp margin tended to become embedded in the bronchial mucous membrane.

(3) *Glass-headed Pin* (with radiogram).—The patient was a girl, aged 3½. The pin, which measures slightly over 2 in. in length, lay head downwards in the left main bronchus, the point being at the carina. It was said to have been "swallowed" two days previously. Removal was effected by means of Paterson's forceps passed through a 5-mm. tube.

DISCUSSION.

Mr. GUTHRIE : The only difficulty in the case of the pin was that when one had the forceps in the tube, the tube being only 5 mm. in bore, it was practically impossible to see the point of the pin. I should like to hear where I can get narrower forceps. I found that Paterson's was the only forceps with which it was possible to do anything. I could not get hold of it with Brünings's forceps. Even Paterson's forceps filled up the tube so much that it was like groping in the dark.

Mr. TILLEY : There are several recorded cases in which the foreign body has dropped into the left bronchus. Yet we are told that the right bronchus is in a more or less continuous line with the trachea. But it is not always so. In the last patient I inspected to-day I saw the bifurcation clearly, and I could see almost directly into the left bronchus. Three times have I removed a foreign body from the left bronchus, and I find my hospital cases are about equally divided between removals from left and right bronchi. There is an excellent long forceps with a narrow shank, invented by Casselberry, of Chicago. It is made of strong steel, and grips very firmly.

Dr. WILLIAM HILL : Twenty-five years ago a paper was published by Dr. Cheadle and Mr. (afterwards Sir Thomas) Smith[1] giving an analysis of a number of recorded cases, showing that there was no predilection on the part of a foreign body to become impacted in one bronchus more than in the other. But I think more foreign bodies enter the right bronchus and yet are more easily coughed up from there, while impaction is more likely to ensue in the left bronchus, since it is smaller. It has been suggested that the left bronchus is a continuation of the trachea as regards direction, but that the right is continuous in respect of size. Perhaps the point can be settled by someone from observations made in the post-mortem room.

Dr. JOBSON HORNE : When a hollow cylindrical foreign body, such as a metal pencil-point protector, becomes lodged and impacted in a bronchus, it is difficult to seize the ring of the tube with a forceps, the teeth of which are in opposition as usual. A forceps with the serrations on the external surfaces of the jaws, when inserted within the cylindrical body and then opened, would secure a firmer and more successful hold of the body.

Sir WILLIAM MILLIGAN : When one has not the most convenient instrument at hand, it is of great advantage to use what one has with the aid of the fluorescent screen as a guide. I have found operating with the aid of the "screen" in difficult cases a great advantage.

---

[1] *Med.-Chir. Trans.*, 1888, lxxi, pp. 113-124.

(*March* 3, 1916.)

Large Naso-antral Polypus.

By Sir WILLIAM MILLIGAN, M.D.

PATIENT, a male, aged 21. There is a history of severe nasal obstruction for years. The growth is seen to occlude the left nasal passage completely and to hang down into the pharynx below the level of the margin of the soft palate.

The man was admitted into the Army with practically complete nasal obstruction, and after a route march was so exhausted that he was sent to hospital, where the growth was discovered. While he was under the anæsthetic, I passed my finger through a large opening into the maxillary antrum. The growth was removed by torsion. That is what I usually do in the first instance. If there is a recurrence, I open the antrum through the canine fossa and scrape the site of origin.

DISCUSSION.

Dr. DAN MCKENZIE: I suggest this be termed *antro-nasal* polypus. The antrum deserves precedence, because the polypus grows there.

Dr. DUNDAS GRANT: I ask whether transillumination was tried in this case. Mr. Lambert Lack showed us a case in which the antrum was full of polypi and in which transillumination revealed no abnormality. In the cases of post-nasal polypi I employ transillumination as a routine procedure, to help in deciding whether the polypi are growing from the antrum, but Mr. Lack's observation upsets the certainty as to its value.

Dr. WATSON WILLIAMS: My method of ascertaining whether the antrum contains polypi is to use the suction syringe, which I have shown several times. It is more certain than transillumination. As soon as you attempt to withdraw fluid from the antrum, the polypi rise to the mouth of the needle and block it. In most cases operation confirms the indications of this syringe.

Mr. TILLEY: A patient's antrum if filled with polypi will be dark to X-rays, even though ordinary transillumination shows it to be clear.

The PRESIDENT: I can confirm that.

(*March* 3, 1916.)

A Note on Treatment of "Functional Aphonia" in Soldiers from the Front.

By Sir WILLIAM MILLIGAN, M.D.

THE patient was "buried" as the result of a shell explosion. He was removed to hospital in a profound degree of shock. There was complete loss of voice.

I have had a number of very troublesome cases of aphonia among soldiers; the worst type has been when the soldier has been temporarily buried as the result of a shell explosion, and has been rescued very much "shocked." In several cases there has been great difficulty in restoring the voice. Ordinary methods have been tried, such as drugs, putting a brush into the larynx, and using electrodes. When these means have failed I have had the patient put slightly under ether, and when he has partially come out of it I have introduced a laryngeal spatula into his larynx and moved it about. Shouting is the usual result, and the continuance of this shouting is encouraged until the man is quite aware that he is shouting. I do not know whether there has been any recurrence of the aphonia after this treatment, because on the voice being restored the patient is taken away.

DISCUSSION.

Mr. TILLEY: A young woman suffering from functional aphonia used to attend the Golden Square Hospital who knew all about the ordinary methods of treatment, for she had been to a number of hospitals. She was lightly anæsthetized, and a strong faradic electric current was used at that stage of recovery when she had no control over her voice, and the screaming to which she gave vent was something to remember; the current was applied until she could have no doubt she was hearing her own voice. She retained her voice for some twelve hours and then insisted on leaving the hospital. There is much functional aphonia in the men coming from the trenches to the base; some of them recover on their way across the Channel. We get a certain number of them over here, and my experience is that it is unwise to begin to try to treat them with the faradic current, as we should an ordinary civilian patient with functional loss of voice. We had two cases in hospital who went down on the *Royal Edward;* one was in the water five hours, the other two hours, and the condition of their nervous system was pitiable. To treat the patients in such cases straight away by active measures I regard as a mistake. After keeping them quiet and comfortable for two or three weeks, local treatment may be undertaken with considerable prospects of success.

Dr. F. DE HAVILLAND HALL: I have had a case similar to Mr. Tilley's. It was that of a female; she was put under ether, and on coming out shouted loudly, but lost her voice again. That was thirty-five years ago. I heard of her again some weeks ago, and she was still aphonic. Sir Morell Mackenzie used to say you should attend to the general condition of the patient before trying to restore the voice.

Dr. DUNDAS GRANT: I agree that these patients should be allowed a period of complete rest before an attempt is made to restore the voice by violent means. At the West End Hospital for Nervous Diseases I have practised "re-educating" them, in the same way as is done in teaching deaf-mutes, by coaxing them to speak by placing the patient's hand under one's own larynx and uttering a strong guttural sound, then placing one's hand under their larynx and asking them to produce the same. Next by getting them to put their mouth into various shapes to express various vowels the method of producing the voice can gradually be re-awakened. They should be taught to breathe properly, because they are sometimes so shattered that this is a difficulty for them. I consider this method gentle, humane and scientific, and the house physician has had several successful results from its employment in cases under the care of Dr. Palmer and the other physicians. There has not yet been a case which has failed us, but some take a long time before yielding to treatment.

Mr. MARK HOVELL: In these cases, many patients feel that they will never be able to speak again, and it is important to give them confidence by the assurance that their voice will come back and that they may find perhaps that it has returned on awaking one morning.

Dr. JOBSON HORNE: We have now seen a good many soldiers from the Front suffering from aphonia. The exhibitor of the present case has wisely placed the phrase "functional aphonia" in quotes. In every case of aphonia from the Front, not due to traumatism, it is of first importance to exclude a diagnosis of pulmonary tuberculosis. Carefully taken notes of the family and clinical histories, reports of the examination of the sputum, of the physical and X-ray examinations of the thorax, and a four-hourly temperature chart are indispensable in arriving at a diagnosis. Many years ago[1] I pointed out that by dismissing aphonia as "functional," "nervous," or "hysterical," a most valuable premonitory sign of pulmonary tuberculosis is liable to be overlooked at a time when the disease is curable.

---

[1] "The Pathogenesis and Earlier Clinical Evidences of Laryngeal Tuberculosis," *Lancet*, August 20, 1898.

Mr. STUART-LOW: I understand that at some military hospitals specialists have been appointed to employ hypnotic and suggestive influences for voice restoration, and that this has been found to be very effective, especially in cases of soldiers who have returned from the Front after having been in action.

Mr. GUTHRIE: I recently had a case of absolute mutism, and the patient failed to respond to hypnotism; but finally he yielded to a process of re-education, in the manner Dr. Dundas Grant has just mentioned.

The PRESIDENT: There may be cases in which the patient is unwilling to speak after the shock has passed off.

Sir WILLIAM MILLIGAN (in reply): I do not wish it to be thought that the method I have described in this case is a routine method. It has been employed entirely in those cases which have remained in hospital week after week without improvement. My practice has been to keep the patient in bed and give bromides and valerian. If these do no good, in a week or so I pass a brush into the larynx; and then if that fails, the battery is used. I agree with Dr. Jobson Horne about the term "functional," but I do not know what else to call it. [Dr. HORNE: Explosion aphonia.] We encourage patients with the idea that the voice will come back, but there is a class of cases which resists that encouragement, and it is in this class of cases the method I have described appears to me to be particularly valuable.

(*March* 3, 1916.)

A Note on Treatment of Gunshot Injuries of the Larynx where "Webbing" of the Vocal Cords has taken place.

By Sir WILLIAM MILLIGAN, M.D.

MY difficulty has been to prevent the cords adhering to one another after the web is divided. I refer to those cases in which the larynx has been much mutilated and there is a cicatrix uniting the cords to one another. Mere division is of little use. In a week you can see the web re-forming. To prevent this, I have had a little instrument made, which consists of a tracheotomy tube, with the inner tube slit down the greater part of its curve. The perpendicular rod is a screwed rod, and on it revolves an equilateral triangle of metal with the sides grooved. By the "direct" method this screw arrangement is passed down through a laryngeal spatula through the hole in the tracheotomy tube, so that its bulbous end lies in the tube itself. An assistant passes the inner tube through the outer one, so fixing the perpendicular rod. By means of vision one judges when the cords are lying opposite the little grooves of the triangular platform. Then a thread is passed through the eyelet, and moored to the patient's ear. It is drawn fairly tight, and examination is again made to see that the platform is in an accurate position. There is at first a little irritation, but this soon passes off and the instrument may be left in for days. It is well to examine the patient every two or three days, to see that accurate position is maintained. I have found the little apparatus of considerable value in cases of severe mutilation of the larynx, because unless something is kept between the vocal cords reunion will occur.

DISCUSSION.

The PRESIDENT: For how long after ceasing to use the appliance can re-union of the web be prevented?

Dr. JAMES DONELAN: It has been fortunate for Sir William Milligan that probably in the large majority of his cases there was very little alteration in the form of the vocal cord. I think the apparatus now shown would not be so useful in cases where there is much cicatricial thickening. Where such a condition exists the portion of the apparatus for keeping the cords open during healing would be more generally useful if shaped somewhat like an O'Dwyer's tube with a double head and about 1 in. long. It will be of some importance to learn how long the cases treated in this manner have remained free from re-union after removal of the apparatus.

Mr. E. D. D. DAVIS: Does not leaving the silk thread attached to the part in the larynx cause ulceration of the epiglottis? In the case of an intubation tube, if the thread is left on, a linear ulcer of the epiglottis develops, and that is a disadvantage.

Mr. W. STUART-LOW: A few weeks ago I showed a case of typical webbing of the larynx, and asked for members' experience in such cases. Dr. Peters said that he had met with a number of such cases, and found that improvement took place if they were not interfered with. It is now six weeks since my case was shown, and it has considerably improved, although there is still a large web uniting two-thirds of the length of the vocal cords.

Dr. H. J. BANKS DAVIS: Is this instrument meant to prevent the increase of the web, or to cause the absorption of the web by pressure after its introduction into the glottis?

Sir WILLIAM MILLIGAN (in reply): The longest period during which a case has been so treated is five months. I agree that there may be some change at the end of a year. With regard to subglottic thickening, those webs have not been very thick; they are comparatively recent cases. They have been less than ¼ in. in thickness. But the same method would be suitable for thick webs; it is something which is adjustable that is needed. I have only once seen ulceration in the epiglottis in a case so treated. With regard to the policy of leaving these cases alone, it must be remembered that they are cases of bad injury, and if something is not done the patient will always have to wear a tracheotomy tube. These webs differ from those usually seen in civil practice, in which there is a small adhesion between the anterior edges of the cords. It is wise to leave the latter cases alone. The apparatus helps absorption to some extent, but it is meant to keep the cords apart sufficiently long to enable the cut surfaces to epithelialize.

(*March* 3, 1916.)

Radiogram showing an Epi-hyal Bone in a Human Subject.

Shown by THOMAS GUTHRIE, F.R.C.S.

THE patient, a man, aged about 50, suffered from carcinoma of the upper end of the œsophagus. The radiogram by Dr. Oram shows a chain of bones apparently representing a complete "hyoid arch," composed of the basi-hyal (body of hyoid), cerato-hyal (short process of hyoid), epi-hyal, and stylo-hyal. The condition is similar to that seen in the dog, a drawing of which is shown.

(*March* 3, 1916.)

Rapidly Growing Epithelioma of the Palate.

By W. STUART-LOW, F.R.C.S.

A MAN, aged 52, who came to the clinic three weeks ago, complained of a burning feeling in the throat, particularly on swallowing food. There was then an ulcerated patch, the size of a sixpence, at the middle of the right half of the soft palate; this has extended rapidly down the anterior palatal pillar and across to the base of the uvula. A piece of the growth was removed and submitted to Dr. Wyatt Wingrave, who pronounced it to be a rapidly growing epithelioma. There was a considerable mass of hard glands at the angle of the jaw on the same side, but this has become much smaller and less indurated since potassium iodide has been given.

The exhibitor has never known radium to have any beneficial influence on such cases, and asks for an expression of opinion from members on this point in the treatment.

This patient, when first seen, suffered from well-marked pyorrhœa alveolaris, and he has been a very heavy smoker. He has had syphilis. Being a night porter at Billingsgate market he has been accustomed to hot drinks, such as scalding coffee taken very rapidly, especially in very cold weather. The exhibitor has found the same habit common in similar cases of malignant disease of the throat, and considers it very likely that such frequent scalding of the fauces may be a contributory cause of cancer.

DISCUSSION.

Dr. DAN MCKENZIE: There is a remark at the end of the notes on this case which I regard as very important. I think many cases of cancer of the pharynx and œsophagus are due to heat. Some time ago I used a thermometer to find out the temperature of the various liquids which people are in the habit of drinking hot, and the result amazed me. Liquids of a temperature which could not be borne on the skin are easily tolerated in the mouth, and 130° F. to 150° F. is the usual range of such hot liquids. At the higher of these temperatures it is necessary to sip. Though the mouth can stand such a temperature, the œsophagus seems to be devoid of sensation for heat. There is a sensation for cold, but that is only experienced when the liquid descends to the cardiac end, where it is held up a little time before trickling through to the stomach. The habit of swallowing liquids very hot as a contributory factor in the production of cancer of these parts is not above suspicion. We probably enjoy the stimulant effect of such liquids, and educate ourselves to a tolerance of them. The temperature of a hot bath is only about 101° F. The profession and the public should be educated as to this danger.

Dr. JOBSON HORNE: I think the public is already "educated" on this matter. A layman recently told me that in China, whilst the men suffer from cancer of the gullet the women seldom do, and the explanation given was that a woman dare not touch the hot rice until her lord and master has satisfied himself, by which time the rice is cool. With regard to the diagnosis of this case, I understand that the man has improved considerably under iodide of potassium; there is a history of syphilis, and the Wassermann reaction is positive. The glands in the neck have subsided considerably under the drug, and I think, therefore, it would be as well to continue that treatment, and perhaps we can see the case again.

Mr. N. PATTERSON: I think this is an excellent case for operation, and surgical procedures ought to be carried out at once. The growth could be removed with the knife, but diathermy would yield the best results. The glands should, of course, be dealt with as well.

Mr. TILLEY: I was surprised to find the diagnosis to be epithelioma; but if I were an examinee and had only one string to my bow in the case, I should say that the lesion is syphilitic rather than malignant disease. With regard to the beneficial effect of radium in these cases, it varies very much. I have seen some cases of marked and extensive malignant disease clear up within a fortnight after radium had been embedded within the diseased area. In others I have seen nothing but harm result. And I do not know of any guide as to when it should be applied. I have not seen squamous epithelioma within the mouth cured by radium, although I have seen it become cleaner and possibly reduced in extent, but this only for a comparatively short time.

The PRESIDENT: There is the possibility that both syphilis and malignant disease coexist in this case. We have the result of the microscopical examination by the expert, and the feel of the growth is a little harder than in the case of a syphilitic lesion. A rapid and thorough antisyphilitic treatment is the proper course at present; this should be followed by diathermy. I have had two cases recently in which I was assisted by Mr. Patterson, and so far the results of diathermy have been better than I think could have obtained in any other way. It is yet too soon to know what the final result will be, but there has been a period of at least five months of ease in patients aged 74 and 69 respectively.

Mr. W. STUART-LOW (in reply): It is not because I have had any doubt about the diagnosis that I have shown this case, for, as stated in the notes, I had a piece of the growth punched out and given to Dr. Wyatt Wingrave, who pronounced it to be a rapidly growing epithelioma. The glands were of stony hardness, but under treatment by mercury and iodide of potassium there was some improvement in the condition of the throat, and the hardness of the glands became very much diminished. A Wassermann reaction was also taken and found positive as stated in the notes of the case. I have, therefore, no hesitation in saying that the case is a combination of syphilis and epithelioma, as remarked by the President. It has been my experience that most cases of cancer of the throat have had a syphilitic history, and I published in the *Lancet*[1] a list of fifteen patients, all of whom had had syphilis before the onset of malignant disease; consequently, I look upon syphilis as a step towards cancer. I frequently use diathermy in malignant disease of the throat, but, although it has a mitigating effect for a time, I have never yet found it curative. The case will be shown again.

---

[1] "Mucin and Malignancy: Facts and Theories," *Lancet*, 1902, ii, pp. 808, 809.

(*March* 3, 1916.)

Case of Aphonia in a Soldier.

By COUBRO POTTER, F.R.C.S.Ed.

A CORPORAL, aged 22, who had been in the trenches for about six weeks, developed what he described as a cold, with loss of voice. He was admitted into hospital, and has been an in-patient for four months. The family history is of no importance.

Present condition : Dr. Stanley Noble examined his chest, and reports that he cannot find any abnormal physical signs. His sputum has been examined several times, and no tubercle bacilli have been found. The X-ray examination reveals nothing abnormal. His temperature has always been normal, with no suggestion of an abnormal evening rise. The man goes about, and states that he feels well. Upon examination of the larynx the tip of the epiglottis is seen to be somewhat thickened, the false vocal cords are swollen and congested, the true vocal cords do not approximate well in the posterior region, and the general impression given is that of subacute laryngitis. No sign of ulceration is present; in the inter-arytænoid region there is swelling of the mucous membrane. The pharynx is generally congested. In the nose there is a septal spur, but no nasal obstruction.

The case is shown with a view to obtaining opinions as to diagnosis and treatment. I am inclined to look upon it as a case showing very early tubercular tendency.

DISCUSSION.

Dr. H. J. BANKS DAVIS: Mr. Potter has asked me to show this case for him. The vocal cords are rounded and pink; Wassermann's reaction is negative; there are no tubercular signs in the chest. The exhibitor particularly wished to know whether members thought the edge of the epiglottis was affected or not.

Dr. DUNDAS GRANT: I think there is in this case well-marked functional aphonia. There is a perverse movement of the cords: as soon as the patient is instructed to phonate, the cords appear to be coming together, and the arytænoid cartilages actually meet, but when the vibrating part in front of the vocal processes comes forward, the arytænoid cartilages at once move away by a perverse action of the lateral crico-arytænoid muscles, as if there were paralysis of the arytænoid muscle. There is thus produced that triangular air space behind the vocal processes which is characteristic of some cases of hysterical aphonia. The cords are much congested, and the laryngitis would account for hoarseness, but not for the aphonia. Sir Morell Mackenzie used to teach that it was important first to subdue the laryngitis when present with functional aphonia. In this case the laryngitis should be treated and then the methods we have been discussing to-day for functional aphonia might be tried.

Dr. JOBSON HORNE: The remarks made by me with reference to Sir William Milligan's case of "functional aphonia" are also applicable to this case.

Mr. TILLEY: I examined this patient before he had been tired by a series of examinations, and I do not agree that it is functional aphonia. He has a very bright red palate and an œdematous uvula; the vocal cord, larynx and epiglottis are red, and the last-named is somewhat thickened at its upper edge. I think it is chronic laryngitis, tending to the hyperspastic type. He is smoking an enormous number of cigarettes a day, and if they were vetoed and treatment with iodide of ammonia carried out, I think he would do well. If it were functional aphonia, he would be able to cough, but he cannot.

Major KENT HUGHES: I think it is a tubercular infiltration, as distinct from tubercular laryngitis; there is swelling of mucous membrane, especially in the interarytænoid space. He will certainly be found to have a slight though constant temperature. I have watched this type of case for the past ten years, and sometimes as long as three years after they come complaining of sore throat, they develop physical signs in the chest—sometimes they develop them as early as two or three months after the first symptoms. The early change in the thickness of mucous membrane is seen when the arytænoids are beginning to come together. The condition may stop at that until late in life. I am sure there is a danger that, if left alone, this patient may develop pulmonary phthisis.

The PRESIDENT: The man has very marked laryngitis, especially at the posterior brim, and the ventricular bands are swollen. I think the behaviour of the arytænoids is brought about by some swelling in them, or infiltration of muscle. It may turn out to be tubercle, but it certainly is not a case of pure functional aphonia.

Dr. WATSON WILLIAMS: I think it is often very important to investigate the condition of the nasal accessory sinuses in cases like the one under discussion. Cases due to trouble there may so closely simulate functional aphonia as to be mistaken for it, the cause being constant reinfection from a latent sinusitis. One patient, a soldier, was brought to me for functional aphonia, because he did not get better and he was losing so much time. I found a latent infection of one antrum at least, and two days after simply washing it out the voice was restored. There was no shock before the aphonia came on. I recommend washing out the maxillary antra in the case shown and examining the secretions.

Mr. CLAYTON FOX: Did the aphonia come on suddenly or gradually? If suddenly, probably the condition is psychic in origin. The jerky movements of the cords on phonation are due to swelling of the mucosa and inflammatory infiltration of the muscles.

Dr. H. J. BANKS DAVIS (replying for Mr. POTTER): The voice became worse slowly and gradually. Personally I was unable to see the cords, the patient being tired and weary of examination; he has enlarged tonsils, and probably adenoids as well, and I should suggest their removal as a preliminary.

(*March* 3, 1916.)

Traumatic Injury to the Nose.

By COUBRO POTTER, F.R.C.S.Ed.

A. P., PRIVATE, was shot through the nose and the left eye. The injury to the nose is peculiar; the nasal bones have both been depressed but remain whole, although the bullet entered from the side; the nasal septum has been partly destroyed. I should like to have opinions as to operation, whether the nasal bones should be raised and the deformity thus removed, or should the case be left alone?

Mr. TILLEY: As the deformity is so handicapping, I think it would be possible to make an incision down the side of the nose, reflect the soft parts, and then raise the nasal bones, which are now crushed in. The lower part of the nose would be more difficult to treat, because of the loss of cartilage there. A plastic operation might be the best solution in dealing with that region.

(*March* 3, 1916.)

Case of Bilateral Dacryocystitis in a Syphilitic Child.

By COUBRO POTTER, F.R.C.S.Ed.

Q. H., AGED 12. No history is obtainable as the child was sent to me from a workhouse infirmary. On examination, both sides of the nose were full of offensive-smelling crusts and the septum was almost completely gone; there was atresia of the left nostril and scarring of the post-pharyngeal wall. The uvula was absent.

Opinions are asked as to the method of treatment.

DISCUSSION.

Dr. H. J. BANKS DAVIS (for Mr. POTTER): The child is a syphilitic subject, and Mr. Potter wishes to know whether it is advisable to operate at all. If so, should the operation be done externally or internally? One nostril (the left) is occluded. I suggested that operation should be internal on one side and external on the other, and that the child should be treated first with antispecific remedies.

Dr. WATSON WILLIAMS: My experience is that operations in syphilitic cases pursue a less favourable course than in non-syphilitic ones, and it is important to give antisyphilitic remedies first. I suggest in this case, after antisyphilitic treatment, an external operation on the right lachrymal sac to make it drain into the nose, in the following manner: (1) Make a linear incision below the inner canthus corresponding with the lower margin of the lachrymal groove; (2) with a raspatory turn the sac from within outwards so as to expose the groove, then push the raspatory through the thin bone at the bottom of the groove into the nose; make a free opening into the nose here; (3) remove the inner and deep wall of the sac corresponding with the communication made with the nose, and close the external wound carefully. In this way one practically does a West's operation from without, and in such a narrow nose as this child has it would be much easier and more likely to succeed than a per-nasal operation. If successful on the right side, subsequently it might be done on the other side. I have done such an operation with excellent results and without leaving any perceptible scar.

(*March* 3, 1916.)

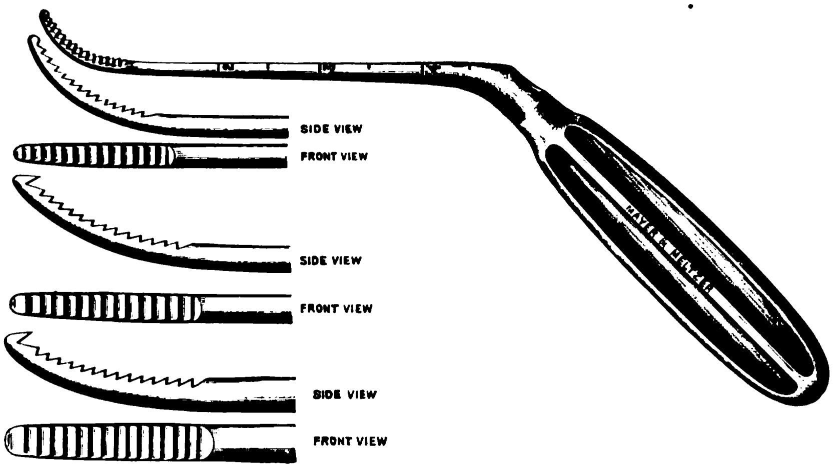
Rasps for the Per-nasal Frontal Sinus Operation.

Exhibited by P. WATSON-WILLIAMS, M.D.

THE three rasps shown are those now used by the exhibitor for the per-nasal frontal sinus operation, practically to the exclusion of his rotating burr and sliding punch forceps. They are in three sizes: small, middle-sized, and large. The small rasp is the same as that used and shown in 1914, the only modification being the addition of a *hooked end* to the two larger sizes. Trifling as it may seem, the exhibitor has found this small modification of the greatest value to the operator, inasmuch as it enables the reduction of the nasal crest to be rapidly brought about by downward raspings with considerable force, because the rasp is arrested as soon as the hooked termination reaches the backward and projecting crest, thereby preventing the damage which would result to the nasal mucosa through the rasp suddenly slipping downwards into the nasal passage.

You will notice that the curve of the small rasp is reduced in the middle size, and still further reduced in the larger-sized rasp, as with the reduction of the crest the entrance to the frontal sinus becomes more and more straightened.

These rasps are also found to be of the utmost service in performing the per-nasal maxillary sinus operation by the method described and illustrated by the exhibitor in the *Journal of Laryngology* in May, 1914.



Watson-Williams's rasps for the per-nasal frontal sinus operation. There are three sizes: the smallest with no hook, but more fully curved than the second and third sizes, which have the hooked terminal. Note, size 1 should have twenty teeth to the inch, sizes 2 and 3 should have fifteen teeth to the inch. The complete rasp above is drawn to half scale; the terminals are shown in full size.

(*March* 3, 1916.)

MAJOR W. KENT HUGHES, M.B., showed a case of lupus of the tongue.

(*March* 3, 1916.)

Growth removed from Right Tonsillar Region.

By J. W. BOND, M.D. (President).

I REMOVED this growth to-day from a woman, aged 49, from the right tonsillar region. She was shown at the last meeting. The tumour came away by the mouth, piecemeal, without splitting the cheek, interfering with the jaw, or tying the carotids. The weight of the growth is $3\frac{7}{8}$ oz.; it extended backwards to the internal surface of the mastoid.

Laryngological Section.

President—Dr. J. W. BOND.

(*April* 7, 1916.)

THE PRESIDENT: The case which I showed at the last meeting has been examined microscopically, and is an endothelioma.[1]

(*April* 7, 1916.)

Specimens from a Case of Laryngeal Crises with Abductor Paralysis.

By E. D. D. DAVIS, F.R.C.S.

A CABMAN, aged 36, was shown at this Section on March 29, 1912. He first attended the hospital in May, 1909, complaining of difficulty in breathing of some eleven months' duration. About twice a week he would suddenly jump out of bed, make a crowing noise and be unable to breathe. The attack lasted a few seconds. He was short of breath on exertion, and breathing was occasionally stridulous. He contracted syphilis in 1903.

The patient was admitted under Dr. Mott, for observation for ten days, and the diagnosis was confirmed.

On examination of the larynx the vocal cords were in a position of almost complete adduction. During deep inspiration there was scarcely any abduction, but there was a narrow chink just in front of and behind the vocal processes. The condition of the larynx remained precisely the same for six years until his death in April, 1915. The pupils were unequal and did not react to light; the optic disks were normal. Knee-jerks were present, there were lightning pains, and there was difficulty of micturition. The Wassermann reaction was positive on two occasions. The gait was normal. He refused tracheotomy and drove a taxi-cab until a day or two before his death.

---

[1] *Proc. Roy. Soc. Med.*, 1916, ix (Laryng. Sect.), p. 94.

He was re-admitted to hospital for laryngeal crises on the night of April 1, 1915. He was restless, but not cyanosed, and, in the intervals, breathing was normal. He was given a hypodermic injection of morphia ($\frac{1}{6}$ gr.) and atropine ($\frac{1}{100}$ gr.), which was repeated six hours later. At 4 a.m. I was asked to see him, and I did an immediate tracheotomy, but he died half an hour later.

The brain, spinal cord and vagus nerves were sent to Dr. Mott for examination, and Dr. Sano will demonstrate the sections for Dr. Mott.

A dissection of the muscles of the larynx, with that of a normal larynx for comparison, are shown to indicate the atrophy of the posticus muscles.

Anatomico-Pathological Examination of the Nervous System

by F. Sano, M.D.

The brain, medulla, spinal cord, and the vagus nerves have been forwarded to the laboratory at Claybury, and a first examination of the medulla was made by Dr. Lena Beach (Carrol, Iowa, U.S.A.). Dr. Mott handed me the material with Dr. Beach's preparations some weeks ago.

In the lumbar spinal cord there is marked sclerosis of the posterior fascicles, except in the deepest part near the posterior commissure. The posterior nerve roots show some atrophy, but there is no thickening of the meninges nor any indication of a recent or old inflammatory condition, and the arteries are not atheromatous.

The cells of the anterior horn are normal, with the exception of some single cells with an eccentric nucleus and a lack of Nissl blocks; this condition is very rare. The anterior nerve roots are normal in appearance.

The cells of Clarke's columns are not quite normal, some of them being atrophic or showing an eccentric nucleus. A careful examination shows that there is a slight increase of neuroglia in the cortico-spinal (pyramidal) tract, and this corresponds to a slight atrophy of this tract. The importance of this statement is evident; it was a case of tabes—not merely a superior tabes, as the sclerosis in the lumbar cord shows. Nevertheless, knee-jerks were present and persisted till death, but the slight atrophic process of the pyramidal tract lends support to the explanation of the unusual persistence of the tendon reflexes owing to the weakness of the cortico-spinal inhibitory influence.

In the cervical cord the posterior sclerosis is limited to the fasciculus gracilis (Goll). The slight atrophy of the pyramidal tracts persist. No other abnormal conditions were observed; as a matter of fact, the lesions found here have their origin far away from the cervical cord. The cause was exogenous; no indications of inflammatory conditions are to be found.

In the medulla the sclerotic lesions are difficult to follow, although the fillet is smaller than the normal. But what exists as a sporadic and exceptional condition in the anterior horn cells is very marked in the nucleus ambiguus, the motor nucleus of the three mixed bulbar nerves (ninth, tenth, and eleventh).

A considerable number of the cells are atrophied, and others exhibit an eccentric nucleus, with a lack of Nissl blocks. No indication, again, of inflammatory activity exists, either around the cells, or in the meninges, or in the nerve roots of the ninth, tenth, and eleventh nerve pairs.

There is evident atrophy of the vagus, with a lack of myelinated fibres, but without increase of connective tissue.

The optic nerve contains an excess of interstitial tissue, and I am inclined to think that the symptoms described in the pupil reflexes must have partially had their origin in the commencing optic atrophy.

I have also examined the cerebral cortex and I found a double lesion in the central convolutions. In the precentral gyrus some Betz cells are atrophied and have an eccentric nucleus, with loss of Nissl blocks. On the other hand, some areas in the post-central gyrus show a complete absence of normal arrangement; in other areas there is a reduction in the number of subgranular pyramidal cells. The last-mentioned condition has been demonstrated by Campbell as of particular occurrence in cases of tabes; the atrophy of the Betz cells without marked increase of neuroglia or thickening of the meningeal membranes is a lesion of spasmodic tabes or of sclerosis lateralis amyotrophica. The case under examination, therefore, should be called a "combined sclerosis," or myotrophic tabes, as some ascending tracts are affected together with the motor descending tract.

The muscles of the larynx show atrophy; some fibres are swollen and have lost their striation; there is a slight increase of the muscle nuclei.

It is important to notice how slowly the process was in developing. Its fatal issue was due more to its dangerous localization than to a greater extension.

I also call attention to the fact that nothing but atrophic lesions were found. It has been proved that general paralysis is the result of an active spirochæta infection of the central nervous system. An attempt has also been made to assign a similar origin to tabes, in which, however, spirochætes have very rarely been found. Under the general denomination of tabes dorsalis very dissimilar conditions have been collected, and confusion has often arisen from imprudent generalizations.

This case, so far as can be demonstrated by actual examination, is one of pure atrophy of slow progression.

DISCUSSION.

Dr. P. **WATSON-WILLIAMS**: This is an exceedingly interesting case; made much more valuable by the research of the pathologists, which has been demonstrated. It is not clear from the notes why the man died half an hour after the performance of the tracheotomy. Was the condition so desperate, and had it been going on long enough to account for the fatal ending when relieved by the tracheotomy? I suggest it as possible that the cause of death was due to atrophic changes in the nucleus ambiguus extending to the cardio-inhibitory cells. In many of the cases of tabes involving the vocal cords, one has evidence of the extension of the atrophic process to the cardio-inhibitory nuclei, the evidence being the *persistently rapid pulse-rate during rest, and in the absence of febrile conditions* this is often a valuable differentiating symptom. There may be one vocal cord only involved, but even when both sides are paralysed (abductor paralysis)—the more common occurrence—one may be in doubt whether, in the absence of other features to clear up the diagnosis, the paralysis is not due to a bulbar lesion. Now the latter view as against peripheral pressure is much supported by the rapid pulse-rate. I think that was the case in the present patient, his pulse being persistently frequent, and that he died from cardiac failure.

Dr. F. **DE HAVILLAND HALL**: I had the privilege with Dr. Semon (as he then was) of seeing the first case in which this abductor paralysis was noted in association with tabes in this country, and the present case confirms the advice then given as to the extreme importance of carrying out an early tracheotomy. Dr. Felix Semon was telegraphed for, and when he arrived the patient was apparently dead. A tracheotomy was done at once and the man lived for some years afterwards. Sir Felix since then has advised that as soon as there are signs of marked interference with breathing, in tabes associated with an abductor paralysis, a prophylactic tracheotomy should be done without delay. It is surprising with what a small chink for admission of air, patients can manage to exist; probably because the obstruction is developed only gradually, so that the system gets inured to the cutting off of the air supply. If obstruction to the same degree were to occur suddenly, the patient would be *in extremis*.

Mr. MARK HOVELL: I understood Dr. de Havilland Hall to say that Sir Felix Semon was the first to recommend that tracheotomy should be done when bilateral abductor paralysis existed. If that statement was made, it was incorrect, for Sir Morell Mackenzie had laid down that principle years before, and it is mentioned in his book which was published in 1880.

Mr. TILLEY: From a practical point of view I uphold what Dr. de Havilland Hall has said. There is a man managing a small refreshment shop near here, who eighteen years ago came into the Throat Hospital, Great Portland Street, suffering from extreme dyspnœa. He was in too serious a condition to allow of a general anæsthetic so I inserted a tracheotomy tube without it. He is still alive. I cannot be sure what was the nature of the lesion; he had no symptoms of tabes, and we could not find any intrathoracic lesion which would interfere with the recurrent laryngeal nerves. It is easy to imagine a patient getting a sudden inflammatory lesion in both crico-arytænoid joints, and then for the inflammation to clear up, the joint being left fixed. Only last Saturday I saw an old gentleman who for five years has had bilateral abductor paralysis, and on two or three occasions he has been nearly suffocated. In his spine and other joints he has advanced arthritic conditions, and both arytænoids are fixed. He has only a small glottic aperture, and if he exerts himself he gets into a serious state of glottic dyspnœa. X-rays give us but little information, except that there is a dilatation of the aorta with a shadow, which may indicate a sacculated aneurysm. If a paralysis is bilateral, whatever the cause may be—i.e., whether it be a central or a peripheral lesion—immediate tracheotomy may often result in a prolongation of the patient's life.

Dr. DUNDAS GRANT: The interest here is the relation of the two symptoms described; one is the adductor spasm or crisis, the other the paralysis of abduction. There seems to be a combination of both in this case. Dr. Sano has pointed out that the lesion here is a paralysis rather than a cortical irritation. We see laryngeal crises apart from paralysis of the vocal cords, and we see paralysis of abduction without what one may strictly call a crisis. What usually happens in paralysis of the abductors is, that the patient makes a howling noise during inspiration, especially during sleep. I should like to ask Dr. Sano if he can tell us what lies at the foundation of the laryngeal crisis. Apparently this man had a crisis about twice a week, and at the same time he had this paralysis of abduction. The reason patients with paralysis of abduction get on so well, comparatively speaking, without tracheotomy is, that in cases in which the disease is a progressive one affecting the recurrent laryngeal nerve, there is a definite sequence in which the muscles atrophy: first the posterior crico-arytænoid, then the internal tensors—i.e., the internal thyro-arytænoids—then the arytænoid muscles. These atrophy before the lateral crico-arytænoids, the atrophy of which would save the situation in so far as the stridor is concerned, though it would lead to loss of voice and probably regurgitation of liquids. It is the wasting of these muscles secondarily which enables people with paralysis of abduction from a progressive lesion of the recurrent laryngeal nerve to breathe after a fashion and to decline tracheotomy.

Dr. WILLIAM HILL: I should like to know whether Dr. Sano has specimens showing the changes in the laryngeal nerves and muscles. There is a serious medico-legal question involved here. This man had a painful spasm in the muscles round the neck which might cause him suddenly to fall down dead. He refused tracheotomy, and yet went on driving his cab. If he had died suddenly while driving, his cab might have dashed into a shop window or have been precipitated over the Embankment. Whose duty was it to prevent him driving? Should one notify the Commissioner of Police that he was suffering from a condition which renders him liable to the accident I have mentioned?

Dr. SANO (in reply): The question here is whether there was paralysis due to hypotonicity and paralytic conditions of muscle, or whether there was irritation, causing contracture. What we found pathologically is more a proof of actual paralysis than of irritation; it is very difficult, in a microscopical preparation, to find indications of irritation. I do not find any increase of neuroglia around the cells in the section. I find only a process of atrophy and weakness. In the spasms of tabes and lateral sclerosis there are often contractures; but there are also moments when the person is too tired. What can occur in the limbs can also occur in the larynx. I have only examined one side of the problem, and I must leave Mr. E. D. D. Davis to speak for the clinical part.

Mr. E. D. D. DAVIS (in reply): The laryngeal muscles were atrophied, and the nerves were very difficult to find. I offered the muscles to Dr. Mott for microscopical examination, but time did not permit. The man promised to stop driving his cab. When he came back to hospital I did not inquire what he was doing, but I found out before he died that he was again driving his cab. He was very ill when I saw him, and by my instructions he had been given morphia and atropine some hours before. I brought him here in 1909, when many members advised tracheotomy; but Sir Felix Semon said he would wait, because the spasm of the adductor muscles might pass off and relieve the patient. With regard to heart failure after tracheotomy, his pulse was very bad; but while I was washing my hands twenty minutes afterwards, he coughed up the tube, and though I replaced it fairly quickly, he was dead. On some occasions the pulse-rate was 120.

(*April* 7, 1916.)

Case of Laryngeal Stenosis, following a Bayonet Wound, treated by Intubation.

By E. D. D. DAVIS, F.R.C.S.

PRIVATE J., who was wounded in the shoulder, received a second bayonet thrust in the larynx on October 13, 1914, and was taken prisoner. The lower third of the thyroid cartilage was apparently destroyed, and a German surgeon inserted a large tracheotomy tube on December 4.

When seen at Millbank on March 3, 1915, he was wearing a large curved cannula inserted through the larynx with an upward extension of ¾ in. (the cannula is shown). He could neither speak nor breathe through the mouth. He had to write everything to make himself understood.

At an operation on March 5, 1915, tracheotomy was performed and the thyroid cartilage was exposed. The cannula was removed, and its extension was found to be buried in scar tissue. The cavity of the larynx was discovered by passing an intubation tube from above. The alæ of the thyroid cartilage were separated by ½ in. of scar tissue at least ¼ in. thick. A large gap, about 1 in. wide, existed between the larynx and the upper end of the trachea, in which the posterior wall of the trachea and larynx alone remained. A rubber drainage-tube was inserted from the tracheotomy opening below, to the orifice of the larynx above, and the wound closed as far as possible, with the exception of the gap produced by the old cannula. The rubber tube was replaced, later on, by the intubation tube, fixed by a midwifery forceps clip passed through the lower tracheotomy opening. The intubation tube and clip were described by Mr. Barwell in the *Lancet* on January 2, 1915 (a pattern was shown, also the various tubes used).

The patient speaks well in a loud whisper; the intubation tube has been worn for twelve months almost continuously, and it has been removed recently, but he cannot do without a tracheotomy tube. Suggestions as to treatment are invited.

Dr. JOBSON HORNE; I ask for the experience of others in dealing with this kind of case. I have had one or two of similar nature, and they are not easy to treat. I congratulate Mr. Davis on his successful result.

(*April* 7, 1916.)

Cases of Chronic Frontal Sinus Empyema treated by the Intranasal Method.

By HERBERT TILLEY, F.R.C.S.

To save space and repetition it may be said that the following cases suffered from one or more of the usual symptoms of sinus empyema—viz., chronic purulent nasal discharge, headache or frontal discomfort, nasal obstruction and impaired condition of general health. The treatment following operation has been practically the same in all cases—viz., no plugging of any kind after the operation, no interference for the first forty-eight hours, and then daily irrigation of the sinuses with warm normal saline containing a small quantity of peroxide of hydrogen solution. As an occasional change from this, tincture of iodine, 1 dr. to the pint of normal saline, has been used.

Mr. C. C., aged 43. Examination, September 17, 1915: Nasal septum deflected to left. Polypi and purulent discharge in each ethmoidal region. Had a previous operation on right side. Operation, October 4, 1915: Intranasal opening of right frontal sinus and antrum and removal of left anterior ethmoidal cells. November 4, 1915: No discharge from any of the sinuses.

Mrs. G., aged 40. Admitted to University College Hospital on March 1, 1916. Left-sided nasal discharge and supra-orbital pain of three years' duration existed. Examination: Pus and polypoid buds in anterior region of left middle meatus. It was only possible to pass a fine probe into the left frontal sinus. First operation, March 2: Anterior half of middle turbinal and diseased anterior ethmoidal cells removed. Free oozing was only slightly diminished by adrenalin and cocaine. A probe could be passed into the frontal sinus but not a small raspatory. Further intervention postponed in view of bleeding which obscured field of operation. During the following days a fine cannula could be passed, but no return of fluid could be obtained. Second operation, March 13: After many attempts, a small raspatory entered the sinus, and the frontal sinus ostium was freely enlarged. March 14: Temperature 103° F.

Both eyelids swollen and œdematous; no conjunctival swelling nor ecchymosis. March 15: Slight œdema of right eyelids. Under influence of frequent fomentations and daily irrigation of left sinus, the external symptoms and pyrexia subsided, and the discharge from sinus ceased.[1] The case illustrates the difficulties which may be encountered when free bleeding complicates a very narrow fronto-nasal canal.

H. C., aged 31. Admitted to University College Hospital on February 28, 1916, for frontal headache of "several years'" duration, and a "blocked nose" for the same length of time. Examination: both nasal cavities filled with polypi bathed in pus. Both antra dark and contained pus. Operation, March 2: Polypi removed. Both antra opened by intranasal method. Ethmoidal regions curetted and sphenoidal sinuses opened. Both frontal sinus ostea were enlarged by exhibitor's raspatories after a lapse of forty-eight hours. Sinuses have been irrigated daily till the patient left hospital on March 29. Whenever the left sinus is irrigated, the fluid returns from the right nasal cavity, showing perforation of intersinuous septum. Complication: On March 12 patient had acute lacunar tonsillitis on left side, with large and tender swelling of glands behind the angle of the jaw. March 14: Temperature 104° F. In my absence, an incision was made into glands but no pus evacuated. Under influence of hot fomentations glands subsided. The patient's original symptoms have entirely disappeared. The tonsillitis set in nine to ten days after operation upon the sinuses, and it is not clear what was the relationship between the conditions, because, from the nasal point of view, the sinuses were irrigated daily (after a lapse of forty-eight hours following operation) and appeared to be exceptionally clean and well drained. It is easy to see into each sphenoidal sinus at the present time.

Mr. McL., aged 50. Subject to attacks of acute iritis in right eye associated with chronic discharge from, and obstruction in, right nasal cavity. Examination: Right nasal cavity filled with polypi bathed in pus. All the right sinuses proved to contain pus. Operation, October, 1915: Removal of greater part of right ethmoidal lateral mass with polypi growing therefrom; right fronto-nasal canal and ostium enlarged; inner antral wall removed (endo-nasal method). Complication: Attack of acute iritis supervened on the operation. As a result of daily irrigation of the sinuses for three weeks the discharge entirely ceased. It is too soon to determine whether the attacks of acute iritis will cease now that the sinuses have been rendered healthy.

---

[1] The symptoms for which patient was admitted have now disappeared (May 16).

DISCUSSION.

Dr. P. WATSON-WILLIAMS: I congratulate Mr. Tilley on his excellent series of cases, and it is gratifying to find these sinuses so remarkably free from secretion. But one most not take such a successful series as a criterion of all cases which are amenable to treatment by the nasal method. In a case I showed when introducing the special discussion on this subject, one in which I was able to stand by the side and pass bougies of the size I show, 19 mm. in circumference, there was most perfect freedom of drainage from the frontal sinus; yet the patient had recurrence of symptoms, and eventually I had to perform an external operation. However successful cases apparently are you cannot be certain there will not be a recurrence and further trouble: it is not merely a question of getting a free exit for discharges. When advocating the per-nasal method, we must be guarded about speaking of cure, otherwise we may have to eat our words. I was particularly interested in Mr. Tilley's case of iritis before the operation, as I recently had a similar case in a female, in whom I had to make an opening and provide for drainage of all the sinuses. She had a recurrence of iritis and acute inflammatory injection of conjunctiva shortly after the operation, and I do not doubt that the operation on the nasal sinuses determined the recrudescence of the attack. This, however, soon cleared up. I shall be glad to know what is the sequel here: it will be an interesting case to watch.

Dr. DONELAN: I should like to ask whether the general experience is in favour of the continued use of peroxide of hydrogen, and whether it has been found to set up anosmia of a more or less permanent character. Also, has not the continued use of chloride of sodium a disintegrating effect on the epithelium? It was a point made by Sir Morell Mackenzie, who substituted sulphate of sodium in his modification of Dobell's solution.

Dr. DUNDAS GRANT: I congratulate Mr. Tilley on his interesting cases, and should be glad to know whether they are a sequence of cases or were interspersed with others in which it was necessary to do the external operation. If they are a sequence, it is a very interesting demonstration of the efficiency of the intranasal treatment, just as Mr. Tilley's former groups of cases of the external operation were convincing of the value of the external operation. I have always been even a keener advocate of the intranasal treatment than my friends and colleagues, and I am glad to find that the views I held in old days have been adopted and maintained so successfully by

Mr. Tilley. I think we shall agree that there are cases in which the intranasal method is not successful, however keen we may be about it. Sometimes, when I have opened the frontal sinus, I have found it filled with polypi, or with a very soft form of œdematous fibrous tissue. In one case the contents (shown before the Section) proved to be adenoid tissue. The only possible treatment in such cases is to open the frontal sinus. After the polypoid substance has been scraped out, these cases do excellently, even without any great attempt being made to enlarge the fronto-nasal duct. The X-ray data make it possible to diagnose them, and as a rule they are accompanied by less suppuration. After studying this series, probably those who have not hitherto trusted to the intranasal operation will be led to do so. The bougies which I devised a number of years ago and showed to the Laryngological Society in January, 1906, will be found of considerable use.

Mr. W. STUART-LOW: I wish to ask Mr. Tilley whether he brings forward these cases as cured. I am opposed, on principle, to treating the frontal sinus through the nose. This should be done merely to prepare the interior of the nose. If there are polypi in the frontal sinus, this method of treatment will not cure the condition. If there are no polypi, removal of the ethmoid will probably do so. How is one to decide whether polypi are present? If they continue troublesome, you must perform Ogston's operation. I asked Dr. Watson-Williams whether he has given up these operations, and he said he probably has. Killian's operation is often unnecessary. There is deviation of the septum in two of these cases of Mr. Tilley's, and in another there is a polypoid condition on the under surface, and there is still muco-pus. It is a bad principle to pass bougies up the canal; this is not done in any other part of the body. I ask Mr. Tilley whether he is still performing intranasal operations for the cure of antral trouble. [Mr. TILLEY: "No."]

Dr. PEGLER: Polypi are often spoken of in this connexion as if they were similar to the polypi found in the nasal cavity. Some years ago I made many sections of frontal sinus polypi so called, and noticed that under the microscope they proved to be quite a different class of growth from the ordinary mucous polypus. It is an important question whether, under modern treatment, it is possible for the life of this very delicate alga-like form of granulation to continue. If the cavity is freely douched with antiseptics, and especially if such active agents as nitrate of silver solutions are injected into it, I should expect these delicate growths to disappear.

Dr. DAN MCKENZIE: I take it that this operation is under trial, and it is only by seeing such cases as are shown to-day and discussing their results and the reasons for the operation that we can know for what cases this operation is supposed to be suitable. I think we have not yet found what cases should be submitted to the internal, and what to the external operation: consequently it is yet early for condemnatory remarks. So far as the operative procedure is concerned, there is much to be said for it from one standpoint, and something may be urged against it from another. When it was discussed on a former occasion, I expressed myself strongly about the danger to the cribriform plate likely to result from the operation. There is a further danger—namely, to the orbit. It is a very narrow canal, and it is easy to break down the papyraceous bone and to start orbital cellulitis. In the male patient I showed this took place, but, fortunately, only slightly; it did not reach the abscess stage. In cases of polypi in the sinus I do not expect the external operation to cure the patient; there is nearly always some discharge afterwards, sometimes considerable in quantity, and the external operation is more dangerous to the patient's life than the internal, which is a minor operation. In the case alluded to I operated on both antra, the septum, and both frontal sinuses at one sitting, and the whole did not occupy more than an hour. Reverting to the danger to the orbit, let me say that if the finger be kept on the outside, the instrument can be felt passing up the infundibulum to the frontal sinus, and in this way the bone may be prevented from being broken through during operation. Mr. Tilley has had difficulty with bleeding, and I suggest to him—what other members may know—that Freer, of Chicago, introduced, some years ago, instead of the tampon of adrenalin and cocaine, what he calls "cocaine mud," that is, a pure cocaine in pure adrenalin solution, 1 in 1,000. It is extraordinarily safe: I do all my nasal septum cases with that mixture. I use 3 gr. to 4 gr. to do an operation, and I have never seen a patient suffer from it. If it be applied to any part of the nose, one can easily get a blanched field, so that the operation almost invariably becomes a bloodless one. I have even opened the maxillary antrum in this way without having had any bleeding at all. I think we ought to regard the operation now being discussed as in a purely experimental stage: let us try it cautiously, and see what results it yields.

Dr. W. HILL: Has Mr. Tilley done external operations during the last two years? I have been converted to the per-nasal route.

Mr. TILLEY (in reply): Dr. Watson-Williams speaks of certainty of cure not being entirely dependent on free drainage, and I agree, because I think two factors determine this point. One is free drainage, and the other is the establishment of a healthy lining mucous membrane in place of the diseased condition it is in when the operation is performed. The latter is carried out by frequent irrigation, and by injecting into the sinus very strong nitrate of silver solutions to destroy the delicate chronic inflammatory tissue to which Dr. Pegler has referred. I employ solutions from 80 gr. to 100 gr. to the ounce. Dr. Donelan raises the question of the use of hydrogen peroxide irrigations causing anosmia. I have not had experience of that, although it is conceivable, because many of the samples which are commonly used contain an admixture of acid and are irritating to sensitive mucous membranes. Dr. Dundas Grant asks as to the sequence of my cases. They are all recent cases, and I do not show them as instances of cures, but hope they may prove to be so. Two are private patients and two are hospital cases; two others of longer duration could not come to-day—they were operated upon six months ago. Mr. Stuart-Low says that muco-pus is still present in all the cases. In two of them there is not a shred of mucus nor of pus. I have shown them to illustrate the complications with which we may possibly meet in the intranasal operation. One patient had great œdema of the left eyelids and a temperature of 103° F. next morning. In forty-eight hours the œdema had spread to the right eye, and I began to wonder whether I was going to experience my first case of osteomyelitis following the intranasal operation. But the condition passed off and to-day she has no pus in the left sinus at all. The discharge which one sees comes from the granulations on the anterior face of the remaining ethmoidal cells. Another of the patients was shown because he had tonsillitis more than a week after the operation, and a large mass of inflamed glands in his neck. The best criteria of the operation are the patients themselves, who will tell you how they feel now as compared with their condition before the operation. If you can so far relieve these patients from the symptoms from which they suffered, I do not think it matters even if a little muco-pus comes from the sinus; you have cured their symptoms so far as the patients are concerned. I have not opened the frontal sinus from the outside for chronic empyema for four years, and in ordinary cases I shall not do so without employing the intranasal method first. If the intranasal method relieves the symptoms for which the patient came to me, I should not proceed to the external operation at all, even though a small quantity of discharge from the sinus continued, because if the drainage is free, that discharge in itself does not constitute a menace to the patient's life, and very often he may be unaware of it at all. One member suggested that these cases have scarcely been touched, and another referred to the presence of deflected septa. Two of the patients have deflected septa; but why remove a septal deflection about which the patient knows nothing and when it is causing no symptoms? When such deformity hampers an intranasal frontal sinus operation, it can always be temporarily obviated by means of a long-bladed speculum. And if you remove the septum, there will possibly be too great a draught of air going down one side, and more harm will be done by correcting the septum than by leaving it alone. I have successfully performed the internal operation for acute empyema complicated by an external fistula.

(*April* 7, 1916.)

Case of Paralysis of the Left Vocal Cord in a Woman, aged 25.

By JAMES DONELAN, M.B.

PATIENT, a married woman, had a miscarriage at the seventh month in 1912, and another at the sixth month in 1913. She began to be somewhat hoarse in November, 1915, and this was associated with repeated attacks of violent headache. On February 8, 1916, on awaking she found she had completely lost her voice.

I believe it to be a syphilitic case. It has greatly improved during the last three weeks under iodide of potassium and mercury. The patient has recovered some voice. Her husband is syphilitic.

(*April* 7, 1916.)

Case of Achalasia of the Cardia cured by the Passage of a Gastric Tube kept in Position for Four Days.

By W. M. MOLLISON, M.C.

E. H., FEMALE, aged 36, was admitted to hospital for inability to swallow, and vomiting. She had previously been operated upon for abdominal symptoms, for which ileo-sigmoid anastomosis and gastrojejunostomy had been performed. Œsophagoscopy showed great dilatation of the œsophagus, which was filled with the remains of bismuth administered six days before; this was washed out. Apart from the dilatation no abnormality was found; a gastric tube was passed, through which the patient was fed for four days; she was then given semi-solids, and gradually recovered the power of swallowing ordinary food without any difficulty. There was no return of the vomiting.

(April 7, 1916.)

Radiogram of the Œsophagus of a Case of Carcinoma which presented itself as an Achalasia.

By W. M. MOLLISON, M.C.

J. G., MALE, aged 49, was admitted to Guy's Hospital in November, 1915, on account of total inability to swallow. Œsophagoscopy revealed no abnormality, and the following day the patient could swallow normally. Five weeks later he was again admitted for the same symptom, total inability to swallow, and he was now very ill and had to be helped into the ward. Again œsophagoscopy showed no lesion; a gastric tube was passed and left in situ for twenty-four hours; at the end of that time it was removed, and the patient swallowed perfectly well.

I quoted this case at the December meeting, and suggested then that the case might turn out to be one of malignant disease. The radiogram shows that this is so, and his doctor writes that the patient is very ill in an infirmary, dying with symptoms of malignant disease of the lower end of the œsophagus.

(April 7, 1916.)

Case of Tracheitis Sicca.

By W. M. MOLLISON, M.C.

FEMALE, aged 18, complains of "foul breath." She has had unpleasant yellow discharge from the nose, but this is now better; the antra have been washed out and are clear. In the trachea are to be seen greenish-black crusts; at times the patient coughs up small pieces, but finds very great difficulty in doing so. Treatment has not improved the condition; she has been given inhalations of tinct. benzoin co. in hot water; capsules of creosote (5 minims), and lastly intratracheal injections of 10 per cent. menthol in paraffin.

(*April* 7, 1916.)

Two Cases of Suppuration in the Antrum of Highmore associated with Uncommon Conditions.

By W. JOBSON HORNE, M.D.

Case I: Gunshot Wound of Face involving Right Antrum.—The patient, aged 23, is a private in the Coldstream Guards. On November 5, 1914, whilst sniping in Flanders, he was struck by a bullet in the upper lip just to the left of the middle line. The bullet shattered all the teeth in the upper jaw, ploughed up the right half of the lip and part of the cheek. On November 9, 1914, he was back in England and in hospital. The mutilation of the mouth and right side of face was rectified by operations. The upper jaw was completely cleared of the remains of the teeth. In February, 1915, he left hospital and was on furlough till May 10, 1915, then returned to his regiment in England. In June, 1915, a dental plate was fitted. A purulent discharge into the mouth was experienced from the time of the injury. To prevent the discharge an operation was performed in December, 1915. After this the discharge ceased to enter the mouth but passed through the right nostril. A second dental plate was fitted in January, 1916, and he returned again to his regiment. As the purulent nasal discharge persisted the patient was sent to the Metropolitan Ear, Nose and Throat Hospital on March 8, 1916. Some puffiness of the cheek over the antrum, and above the right angle of the mouth, suggested underlying dead bone; this puffiness was partly accounted for by the soft tissues having been drawn up from the lower part of the face in order to rectify the mutilation. On the head being lowered the right nostril became filled with pus. On transillumination the right antrum was dark. An examination with the X-rays detected no foreign body, but showed some loss of bone.

Operation: The antrum was opened through the canine fossa and drained through the nose and mouth. Some bare bone was detected beneath the puffy region referred to, but no pus external to the antrum was found. Owing to the high formation of the palate, the floor of the antrum is considerably below the level of the floor of the nose.

At the time of writing these notes the discharge is decidedly less, and has almost ceased, but suggestions for future treatment, should there be a recurrence of the purulent discharge, are invited.

Case II.—J. E., gunner, R.F.A., aged 19. He has had aphonia for three months following a cold contracted at the Front. Larynx: Impaired adduction, loss of tension of cords. Thorax: X-rays show infiltration of right upper pulmonary lobe. Tubercle bacilli are present in the sputum. The larynx presents an appearance not uncommonly seen in cases of aphonia invalided from the Front, and at times spoken of as "functional."

Dr. DAN MCKENZIE: In the first case the patient is suffering from osteomyelitis, and I suggest that Dr. Horne should keep his eye upon it for the next six months, in the event of there being a recurrence. I have seen, on two occasions, fatal osteomyelitis begin in the antrum, and with such symptoms as are mentioned in these notes, puffiness over the cheek and angle of the mouth. This is remedied for the time being by removing the dead bone, but the symptoms are very apt to recur.

(*April* 7, 1916.)

Intrinsic Cancer of the Larynx—Case to show certain Indications in regard to Laryngo-fissure and Complete Excision of the Larynx.

By Sir STCLAIR THOMSON, M.D.

W. S., AGED 56, admitted to King's College Hospital on January 27, 1916, for hoarseness of voice.

Previous history: Hoarse for one year; recent dyspnœa, no dysphagia, slight cough.

Present condition: Voice very husky, and stridor even when at rest. Glottis reduced to a chink. The left vocal cord is quite fixed in the middle line with grey-yellow ulcerating infiltration from the vocal process up and into the epiglottis. Low down in the anterior commissure is a red granulation, which suggests perichondritis of the thyroid cartilage. The right vocal cord moves feebly; it is replaced by an irregular, cauliflower-like, pale reddish infiltration. The anterior commissure appears involved. The arytænoids are free. There are no glands. Patient has good teeth; non-smoker for thirty-three years. Wassermann's reaction negative. Tubercle bacilli absent in sputum.

February 3: Portion of growth removed by indirect method with the Mackenzie forceps and found to be a squamous-celled carcinoma.

February 12: A median tracheotomy was done under local analgesia and a Durham's tube inserted. The trachea was laid bare on each side and packed with iodoform ribbon gauze. This packing was done with the object of exciting granulations and so anchoring the trachea to the cellular and muscular tissue of the neck. The idea was taken from the article of G. W. Crile.[1]

March 2: Operation commenced for complete excision of the larynx. Middle line of neck infiltrated with 2 per cent. novocain, with a few drops of adrenalin. Chloroform was given. The first incision revealed just above the thyro-hyoid membrane a gland, about the size of a large haricot bean. This at once showed that the growth was no longer intrinsic. On removing the exposed gland there was an escape of some thirty drops of pus, and with a probe it was found that the thyroid cartilage had been invaded. The operation was therefore abandoned.

The case is shown for the following reasons:—

(1) Long-standing hoarseness and extensive disease in the endolarynx, without any visible extrinsic developments.

(2) Involvement of both cords.

(3) Marked extension of the disease to the anterior commissure (it is generally taught that malignant disease affects the posterior commissure by preference).

(4) The suggestion of perichondritis, given by the granulation, in the anterior commissure.

(5) The gland on the crico-thyroid membrane is the first involved.

(6) The involvement and perichondritis of the thyroid cartilage may only be revealed at operation. (I had a similar case a good many years ago, and fortunately am able to show a coloured drawing of it.)

(7) The plan for anchoring the trachea—by packing round it, for between two and three weeks—promised to be most satisfactory, and I should employ it another time to prevent the retraction of the divided trachea into the chest.

A section of the small gland from the cricoid membrane is shown.

The PRESIDENT: Apparently a laryngo-fissure failed to secure a satisfactory result, and a very extensive laryngectomy was not decided on.

---

[1] *Laryngoscope*, 1912, xxii, No. 12, p. 1317.

(*April* 7, 1916.)

Epithelioma of the Palate.

By W. STUART-LOW, F.R.C.S.

THIS case was shown at the last meeting. Since then the induration around the ulcer has increased. There is much more pain on swallowing, and the deep glands at the angle of the jaw have become harder.

(*April* 7, 1916.)

Case of Malignant Disease treated by Diathermy.

By J. W. BOND, M.D. (President).

THE patient is a man, aged 70, who underwent diathermy. He had two sittings, one in October and one in November last year. There was a four months' history; and, when first operated upon, a large ulcerating mass affected the tonsillar region, encroaching upon the palate, passing down to the angle between the tongue and tonsil, and a little way on the tongue itself. For five months following the two sittings he has been very comfortable. Before the first diathermy treatment he was in a most miserable condition: he was pale, wasted, and found it very difficult to take food. He still has some pain in the ear, and I do not think the case can be considered cured. I recommend diathermy in cases of this kind. It seems to give more relief in inoperable cases than any other method.

DISCUSSION.

Dr. WATSON-WILLIAMS: I hope, Sir, you will give a full description of the condition before the operation, because the result seems to be so gratifying that I imagine you were perhaps surprised at it. Is it not possible that the pain the patient now has is due to cicatricial contraction? He complains of a difficulty in opening his mouth.

Dr. DUNDAS GRANT: It is a most gratifying result. Was it microscopically proved to be epithelioma?

Mr. ROSE: I have treated a number of these cases by diathermy, and in some of them the neck has been much swollen for a week or ten days afterwards. I have noticed that in patients who turn up two years after the original diathermy with evidence of recurrence, an almost normal epithelium may cover extensive disease. I am therefore convinced that after diathermy epithelium grows over tissue which still contains malignant cells.

Dr. DAN MCKENZIE: I ask if members have had experience of the use of diathermy in sarcoma, as opposed to carcinoma or epithelioma of the throat; if so, whether the results are different? Also, would it be better, in recurrence of sarcoma to use radium rather than diathermy?

Mr. ROSE (in reply to Dr. McKenzie): I have used diathermy once for sarcoma, but without knowing it. The growth was a melanotic sarcoma in the hard palate. I hope to show the patient to the Section.

The PRESIDENT (in reply): The case has not been proved to be epithelioma. The application lasted ten minutes each time. I operated upon two men in this way on the same day. The other patient was aged 74, and he has done equally well. It was a similar case, the disease being situated on the same side of the throat. The patient I showed was worse than the other one for two days after operation. There was a little swelling, but nothing to cause alarm. At the first sitting I made a circuit of the area in eight places. At the second operation, instead of burning definite spots, the instrument was slid along in a circle round the growth, and the diathermy done with a smooth surface, not a point.

(*April* 7, 1916.)

Case of Retro-pharyngeal Abscess due to Breaking Down of a Tubercular Gland.

By IRWIN MOORE, M.B.

THE patient is a female, aged 25, who was admitted to hospital on February 24 complaining of a swelling in the throat for one month, accompanied by soreness at night and some difficulty in swallowing. She was said to have swallowed a fish-bone about fourteen days before the swelling was noticed. There has been no febrile disturbance. She is married and has one child, aged 3, who has recently been operated upon for tubercular glands in the neck.

On examination a well-marked and prominent swelling was seen occupying the right half of the pharynx and extending for some distance downwards to about the level of the upper part of the larynx. On palpation it was found to be boggy and semi-fluctuating, with a thickened wall. The tonsils were buried and contained open crypts. Some enlarged cervical glands could be felt on each side of the neck along the posterior border of the sternomastoids. A skiagram showed no indication of caries of the spine.

On March 13 operation had to be postponed on account of an acute attack of follicular tonsillitis. A week later the abscess was opened by dissection from the posterior border of the right sternomastoid; about ½ oz. of pus was evacuated and a drainage-tube inserted. Some tubercular-looking glands were also removed from the side of the neck. Examination of the pus showed that it was of a caseous rather than purulent nature—i.e., it did not contain pus cells. No bacteria were found in a Gram-stained film and none grew in culture. In view of this result a film was stained for tubercle bacilli, and these were found to be present in extremely small numbers. "Examination of the glands displayed the typical histological structure of a tuberculous lesion." (Report from Dr. Eastes's Laboratory of Pathology.)

Since the operation a fortnight ago the patient has been suffering from paresis of the right sympathetic, manifested by the following symptoms: pseudo-ptosis, enophthalmos, and contracted pupil. There has been free discharge from the abscess, but this has considerably lessened during the past three days, and the swelling in the pharynx has greatly decreased.

Dr. George Thompson kindly saw this case with me yesterday, and considers that the paresis will probably gradually clear up.

The case is shown for the purpose of ascertaining the opinion of members as to whether in these cases, independent of spinal caries, the abscess should be opened through the mouth or by the external route.

DISCUSSION.

The PRESIDENT: Many cases are properly opened at the side of the neck, but in young children there is no occasion, when the abscess seems to be pointing in the pharynx, to open it in the side of the neck. It is easy to put the child on its side and open the abscess, allowing the pus to flow quickly to the front of the mouth. I remember being fetched, one night, some miles to do tracheotomy on a child, and found it in this condition. By the use of sinus forceps the abscess was evacuated with extreme ease by putting the child on its side for a time, and rolling it forward on its face as soon as the pus came. Where there is no urgency and it is not pointing in the front, it is well to open from the side.

Mr. CLAYTON FOX: I should like to ask whether this is really a retro-pharyngeal abscess. Retro-pharyngeal abscesses usually arise either from tubercular disease of the retro-pharyngeal lymphatic glands or spine. These glands atrophy by the fourth year of age. In this instance the patient's age is 25. May it therefore not have been a latero-pharyngeal abscess, which pointed in the pharynx?

Dr. DAN MCKENZIE: The question asked by Mr. Fox is important, because it raises the further question of treatment. In retro-pharyngeal abscess I think opening through the mouth is perfectly satisfactory: there is no need to operate through the side of the neck. But in lateral pharyngeal abscess in the deep cervical glands, the pus may track along until it finds its way out, and such an abscess can be opened from outside. When there is bone disease the abscess should be opened in a position where it can be kept aseptic; thus, when there is bone disease, the abscess should not be opened through the mouth. But in tuberculosis of the retro-pharyngeal glands the operation can be safely and easily performed through the mouth, the abscess being opened and curetted. I showed cases of this kind before the Section a few years ago.

Dr. DUNDAS GRANT: I have seen retro-pharyngeal abscess in two adults opened through the mouth, with excellent results. These abscesses, which are not common in adults, were not due to vertebral disease; they seemed to have arisen from exposure to cold.

Dr. IRWIN MOORE (replying to Mr. Fox): There were two or three glands in the neck along the posterior border of the sternomastoid which I removed, and they were tubercular. It is possible that the abscess is secondary to infection of a deep cervical gland.[1]

---

[1] On May 7—i.e, seven weeks following the operation—all discharge had ceased, the swelling in the pharynx had disappeared, and the external wound in the neck had closed. The paresis of the sympathetic (pseudo-ptosis, &c.), though somewhat better, has not yet cleared up.

(*April* 7, 1916.)

Case of Syphilitic Disease of the Larynx.

By IRWIN MOORE, M.B.

H. L., FEMALE, aged 38, shown at the December meeting as a case of doubtful malignant disease of the arytæno-epiglottic fold and ventricular region of the left side of larynx—now found to be syphilitic.

A short history of the case is described in the *Proceedings* of this Section for January, 1916.[1] The left vocal cord was almost entirely concealed by a smooth round swelling of the arytænoid epiglottic fold and ventricular band. There were complete paresis of the left vocal cord and fixation of the arytænoid, with marked hoarseness, difficulty in swallowing, and considerable pain on palpation of the larynx, due to perichondritis. The patient had lost 2 st. in ten months. Some opinions were expressed that the case was malignant, whilst others thought that it was tubercular. As the patient's condition remained *in statu quo* for two months and did not respond to treatment with potassium iodide and mercury, Mr. Wilfred Trotter was asked early in January to see the case, and he expressed his opinion as somewhat in favour of malignant disease.

A portion of the growth was removed on January 11; microscopical examination revealed some inflammatory reaction just beneath the surface epithelium, superficial to the numerous glands, and Dr. Eastes's report stated that it was non-malignant.

At the end of February the patient was admitted to hospital with well-marked stridor due to increasing swelling of the growth. A tracheotomy was therefore performed under local analgesia. At the operation the thyroid isthmus was found to be fibrous and firmly attached to the trachea. It was separated with difficulty and divided; the left lobe was also fibrous and found to contain a caseated cyst, which had the appearance of a broken-down tubercular nodule. There has been no variation in temperature. The chest was thoroughly examined, but no physical signs suggesting tuberculosis were found.

---

[1] See *Proceedings*, p. 39.

The sputum was slightly purulent, but no typical bacilli were found in it. The blood, however, gave a positive reaction to the Wassermann test.

On March 22, 10 c.c. galyl (25 cgr. strength) were injected into the right median basilic vein. The three following days the patient complained of muscular pains in the right forearm, neck, scalp and back of the eye with some dimness of vision, and these symptoms still continue. Dr. George Thompson kindly examined the patient yesterday and reports that the optic disks were quite normal, and that the condition must be attributed to a toxæmia affecting the muscles of accommodation, probably not in any way connected with the galyl. With these exceptions the patient has improved daily. All pain on palpation of the larynx has disappeared. The swelling in the larynx has become considerably reduced, more of the left vocal cord can be seen, and the hoarseness is much less marked, though the cord is still immobile.

This case is of interest in showing the difficulties in diagnosis which such affections of the larynx may present.

Postscript.—In view of the marked benefit derived from the galyl injection, a further dose of 10 c.c. (25 cgr. strength) was given a month later—i.e., on May 14. This was followed by a severe and alarming attack of arsenical poisoning from which the patient only slowly recovered. Marked improvement in the larynx followed the second injection, and the patient has been able to breathe through the natural passage with her tracheotomy tube corked, since May 23. The swelling in the larynx, though reduced sufficiently to allow full exposure of the left vocal cord, still narrows the glottis to some extent, and the cord is still fixed. Patient has therefore been advised to retain the tube a few weeks longer for safety, while treatment with Ki. and Hg. is being carried on.

(*April* 7, 1916.)

Case of (?) Nervous or Functional Aphonia.

By L. H. Pegler, M.D.

Patient, a soldier, aged 39, lost his voice for about sixteen days, fifteen months ago; it returned spontaneously, and he retained it till nine weeks ago. He has served in Africa and India, but not in the present War, and as a home service man he was on garrison duty at

Stratford Camp when his voice left him again. On admission to hospital he had a cough, a feeling of tightness in the throat, and a good deal of nasal obstruction owing to a very marked deflection of the septum with an ascending spur in the left fossa; there was also much chronic rhinitis with sticky secretion. The fossæ are clear now, after submucous septal resection and reduction of the right inferior turbinal. The vocal cords have the appearance common in chronic laryngitis of long standing, being reddish, rounded, and rough on the surface; there is some asymmetry of the two cords and arytænoids, and thickening of the interarytænoid space.

When the man is asked to phonate, the cords hesitate in adduction and fail to approximate fully, a bowed interval sometimes intervening, while at others the glottis assumes some other shape; in fact, it varies at different sittings, but there is always a sudden occlusion of view through the closing down of the epiglottis with a kind of snapping action. The voice has improved a little at times, but the cough is always phonic. The physician in charge reports absence of chest signs, tubercle bacilli, or temperature; he has not thought the Wassermann test necessary.

DISCUSSION.

The PRESIDENT: In this case the cords seem to be at different levels and of different widths, and there is a little thickening of the brim. I doubt whether it is nervous aphonia.

Dr. JOBSON HORNE: This makes an interesting addition to the series of cases we have seen during the War, which have been labelled functional or nervous aphonia without the cause having been ascertained. In this case I agree with the President that the condition does not suggest nervous aphonia; it has the appearance of laryngitis, because the arytænoids are swollen and the cords reddened and fleshy-looking. I think the condition is due to the man's work; he has been guarding the worst-ventilated tunnel on the South-Eastern Railway; after a train has passed through, the suffocating fumes irritate his larynx. The appearance is like that seen in men who have been "gassed" at the Front. If he has complete rest of the voice I think he will make a good recovery.

Dr. DUNDAS GRANT: There is here sufficient laryngitis to cause slight hoarseness, but not loss of voice, and anything beyond the hoarseness I think is due to a functional condition. He has not been exposed to shell shock, and probably does not wish to be. There is a disturbance of the cortical centre for phonation to such extent that there is an interruption to the transmission of stimuli. In the case of aphonia which Dr. Jobson Horne brought, the aphonia had disappeared by the time we examined him.

Mr. CLAYTON FOX: I made out that there was decided thickening of the arytænoids, especially the left. With regard to the dysphonia, the swelling of the mucosa and involvement of the muscles are sufficient to account for his difficulty in phonation. He admits that he sweats at night, and I am suspicious of tubercle. I should like to know whether the Wassermann reaction has been taken, and think his sputum ought to be frequently examined. The chronic laryngitis can in great measure be accounted for by long-standing nasal obstruction.

Dr. PEGLER (in reply): I have noted the difference in appearance of the cords and the slight asymmetry of other features of the larynx just mentioned by the President. As regards Dr. Jobson Horne's point about the presumed ill-effects of the tunnel fumes on this patient, it was the former attack that followed exposure to this agent when the voice both left and returned suddenly. I admit the degree of chronic laryngitis still present, but the dysphonia and some of the vagaries of the functional type are superadded. I may say that two of our best authorities, who have left the meeting, regarded the case as one of typical functional aphonia, but Dr. Dundas Grant's lucid observations upon it so completely embody my own views that I need only refer to what he has said for a just expression of them.

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

MEDICAL SECTION

1805-1834
1907

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Medical Section.

OFFICERS FOR THE SESSION 1915-16.

President—

ARCHIBALD E. GARROD, M.D., F.R.S.

Vice-Presidents—

H. P. HAWKINS, M.D.
H. D. ROLLESTON, M.D.

Hon. Secretaries—

CHARLES R. BOX, M.D.
W. CECIL BOSANQUET, M.D.

Other Members of Council—

J. CHARLTON BRISCOE, M.D.
JOHN FAWCETT, M.D.
DAVID FORSYTH, M.D.
A. J. HALL, M.D.
P. HORTON-SMITH HARTLEY, C.V.O., M.D.
ROBERT HUTCHISON, M.D.
A. G. PHEAR, M.D.
H. BATTY SHAW, M.D.
F. PARKES WEBER, M.D.
F. J. WETHERED, M.D.

Representative on Library Committee—

G. NEWTON PITT, M.D.

Representative on Editorial Committee—

CHARLES R. BOX, M.D.

MEDICAL SECTION.

CONTENTS.

November 9, 1915.

DISCUSSION ON PARATYPHOID FEVER.

PAGE

Opened by Sir **Bertrand Dawson**, K.C.V.O., M.D. 1

Professor **Georges Dreyer** (p. 9)—Sir **Wilmot Herringham** (p. 16).

November 23, 1915.

Discussion on Paratyphoid Fever (*continued*) :—

Sir **William Leishman** (p. 17)—Fleet-Surgeon P. W. **Bassett-Smith** (p. 21)—Professor **Castellani** (p. 24)—Dr. **Henry Robinson** (p. 27)—Captain H. L. **Tidy** (p. 29)—Major C. **Miller** (p. 30)—Captain **Kenny** (p. 32)—Dr. C. H. **Browning** (p. 33)—Dr. E. **Stolkind** (p. 34)—Sir **William Osler**, Bt., F.R.S. (p. 38).

Bismuth—X-ray Localization of Dysenteric Ulceration By C. J. **Glasson**, M.D. (Communicated by Colonel Sir **Ronald** Ross, K.C.B., F.R.S., A.M.S.) ... 39

Ulcero-membranous Stomatitis and Gingivitis among Troops: its Cause and Treatment (preliminary report). By **Frederick** B. **Bowman**, M.B.Tor. (Communicated by Professor Sir **William Osler**, Bt., F.R.S. Taken as read 51

MEDICAL AND THERAPEUTICAL AND PHARMACOLOGICAL SECTIONS.

(COMBINED MEETING.)

February 15, 1916.

DISCUSSION ON TRENCH NEPHRITIS.

PAGE
Opened by W. Langdon Brown, Captain, R.A.M.C.(T.F.) i

Sir William Osler, F.R.S. (p. xiv)—Dr. F. W. Andrewes, F.R.S. (p. xvii) —Mr. R. L. Mackenzie Wallis (p. xix)—Captain R. G. Abercrombie (p. xxxvi)—Captain Langdon Brown, R.A.M.C.(T.F.) (reply) (p. xxxix).

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

John Bale, Sons & Danielsson, Ltd., 83-91 Great Titchfield Street, London, W.

Medical Section.

President—A. E. GARROD, Colonel A.M.S., F.R.S.

AND

Therapeutical and Pharmacological Section.

President—W. HALE WHITE, Lieutenant-Colonel R.A.M.C.(T.F.).

(*February* 15, 1916.)

DISCUSSION ON TRENCH NEPHRITIS.

Opened by W. LANGDON BROWN, Captain R.A.M.C.(T.F.).

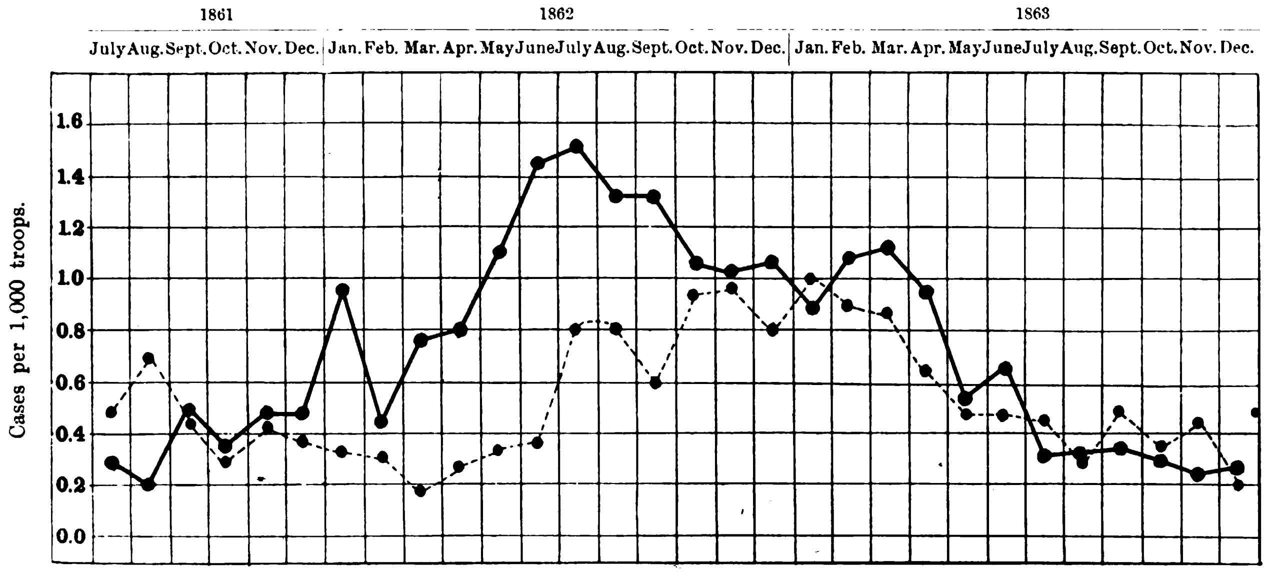
MR. PRESIDENT,—I much appreciate the honour you have done me in asking me to open a discussion on this important subject. My only justification for accepting the invitation is that in May last the Medical Research Committee, at the request of the Director-General, made arrangements for a number of these cases to be investigated, in wards under my care, at the St. Bartholomew's Hospital Section of the First London (City of London) General Hospital. They also arranged for the services of Mr. Mackenzie Wallis and Dr. Trevan in making the chemical investigations. I am also much indebted to the staff of the Pathological Department of the Hospital, under the direction of Professor F. W. Andrewes, for their willing co-operation. I have had more than 100 cases under my care, but only fifty-eight of these were specially investigated.

It is difficult to choose a name for the condition we are about to discuss which shall not beg the question of its origin. "Epidemic nephritis" assumes what I am trying to prove. "Trench nephritis" is not strictly accurate, since I have had cases among orderlies from base hospitals and others who have not been in the trenches. Still, the condition cannot be said to be prevalent outside the trenches, so the name will serve.

Acute nephritis is not a common disease in civil practice; it is not possible to give exact figures, since it is not a notifiable disease, but Sir Wilmot Herringham found that at St. Bartholomew's Hospital, with an average number of 7,000 medical admissions a year, only 166 cases of acute nephritis, 120 being males, were admitted during nine years. I found that in a period of five years only twenty-six cases occurred there in men of military age.

Now, whereas typhoid fever and dysentery have in the past dogged most campaigns, acute nephritis, as a rule, has not. I have not been able to find that it was prevalent in the Franco-Prussian War, the Chino-Japanese War, the Soudan War, the Hispano-American War, or the Russo-Japanese War. It was certainly rare in the South African War. Thus the late Dr. Washbourn reported that "acute nephritis was singularly infrequent." At Deelfontein there were only six cases of acute nephritis. Dr. Tooth reported that at the Portland Hospital they only saw three cases, and in these the kidney lesion was almost certainly not acquired during the campaign. Personally, I did not see a single case in South Africa.

On the other hand, there was a very considerable outbreak of the disease in the American Civil War. I have drawn up a curve by adding together the cases classified as general dropsy, Bright's disease, and inflammation of the kidney. This is necessary, as the diagnosis of Bright's disease, which was not made till September, 1862, gradually replaced that of general dropsy, which was discontinued in December, 1863. The curves will therefore include cases of chronic nephritis, but this would not affect the extraordinary rise which took place between March, 1862, and March, 1863. The case-incidence per 1,000 troops rose earlier in the armies of the Central Region, and reached a higher level than that for the rest of the army. In subsequent years there was no similar rise, though the curve shows a small secondary rise during the warmer months of 1864. In the Central Region the incidence reached 1·5 per 1,000. Throughout the war there were 14,187 cases. Table I shows the number of cases in each year compared with the number of troops employed. It is of great interest to recall that in the American Civil War the military conditions resembled those of the present War in some important particulars. There was the sudden dash of the Confederates northwards, which was checked and followed by prolonged trench warfare.



Curve showing incidence of nephritis per 1,000 troops during first part of American Civil War among the Northern armies. The armies of the Central Region were attacked earlier and more severely by the disease. Black continuous line = Central Region. Dotted line = rest of army.

TABLE I.—CASES OF NEPHRITIS IN AMERICAN CIVIL WAR IN NORTHERN ARMIES.

Date	Average strength	Cases of nephritis	Number of deaths
May—June, 1861 ...	42,500	27	—
July, 1861, to June, 1862	279,000	1,790	45
July, 1862, to June, 1863	614,000	6,603	148
July, 1863, to June, 1864	619,700	2,677	81
July, 1864, to June, 1865	574,000	2,744	77
July, 1865, to June, 1866	101,800	346	9
	Totals	14,187	360

The present epidemic in the British Expeditionary Force is not assuming such dimensions as these. I am not permitted to give the full figures, but am allowed to state the following facts: Up to the end of June 1,062 cases had occurred. Very few were reported until February, in which month 72 cases occurred, 138 in March, 220 in April, 211 in May, and 326 in June. Since then the monthly returns have shown a steady increase. It is interesting to note from the discussion on the subject in Vienna that there has also been an outbreak among the German and Austrian troops, and that it began about the same time as in our Army.

ÆTIOLOGY.

It is a hallowed tradition in medicine that exposure is a very important cause of nephritis. Yet we notice that while the troops were enduring much cold and exposure during the bad winter of 1914-15 there were but few cases of nephritis. It was not until the weather was better that the disease assumed epidemic proportions. But so ingrained is the tradition that attempts were made to show that, although continued cold was not responsible, the violent fluctuations of temperature in the early spring played an important part. I imagine that theory died a natural death as the summer came on and the number of cases increased. Still, as I am not sure that exposure has been given up as the cause, I will add the following arguments: When I was in Bloemfontein during the South African War I saw the mirage between 2 and 4 p.m., while by 6.30 p.m. the ground was covered with hoar-frost. There could hardly have been such a violent fluctuation of temperature as this in Flanders; yet, as I have already said, nephritis was rare in the South African War. In the Russo-Japanese War, during the month of February, 1905, the thermometer showed great differences between the minimum and maximum readings, such as from 14° to 83° F., and from 26° to 75° F. Yet I do not read that there was an outbreak of nephritis. Again, look at the incidence in the American Civil War: how can a climatic cause account for an outbreak which started in March and lasted for a whole year, but which was not repeated in the subsequent years of the war? However, I made careful inquiry as to exposure in the fifty-eight cases which were the subject of special investigation; in twenty cases the men were sure they had been specially wet before the illness began, whereas in thirty-eight cases no such history could be obtained. I doubt very much if mere exposure damages healthy kidneys. On the other hand, I do think that exposure will exacerbate chronic nephritis, and I have seen a return of the albuminuria in some of these cases when apparently convalescent if the patient got cold. Probably the theory of nephritis starting from cold obtained currency in some such way. The trend of modern research has been to discredit climate as a cause of epidemic disease, though past beliefs are enshrined in such names as malaria and influenza.

Many other causes have been suggested; of these the question of the water supply demands consideration first. There is the possibility of the water having been derived from an unwholesome source, or that chlorination of the water or some metallic poison derived from the galvanized water-carts or water-bottles might have been responsible. My cases lend no support to any of these hypotheses; the sources from which the patients had obtained water were extremely variable. Moreover, some had been careful about boiling the water, others had not; in some cases the water had been chlorinated, in others it had not.

Excessive protein diet has been suggested as a possible cause. It seems highly improbable that 180 grm. of protein would cause acute nephritis in a number of otherwise healthy men. If it did, it could only be through setting up an intestinal toxæmia. Mr. Mackenzie Wallis's observations are definitely against the presence of an intestinal toxæmia, since he found neither an increase in the ethereal sulphates nor the presence of urobilin in the urine.

Acidosis has also been suggested as a cause, on account of the frequency with which dyspnœa occurred in the early stages of the disease. It is not clear how acidosis could arise on the diet given to the troops, nor is there a general agreement that acidosis can cause nephritis. Acidosis was not a constant feature in the cases with dyspnœa in which we investigated the CO_2 content of the alveolar air.

In the discussion held at Vienna on this outbreak various other causes were suggested, even including the deliberate taking of cantharides or chromic acid by soldiers in order to render themselves unfit for further service. The combination of alcoholism and exposure was also suggested. However plausible alcoholism might be as a cause among German troops, it would not explain the outbreak in ours. Dysentery and typhoid fever were suggested as causes, but other speakers called attention to the lack of agreement between the curves of incidence of the intestinal and the kidney conditions. Moreover, dysentery and typhoid were rife in South Africa, yet nephritis was rare. Some speakers regarded the condition as an exacerbation of chronic nephritis, but this would only apply to a few cases. Thus in my series there was a previous history of nephritis in only five. Moreover, there is no reason to suppose that there is a larger proportion of men with damaged kidneys engaged in this War than in other wars. Antityphoid inoculation has also been held responsible, but there is no evidence that the injection of immune bodies can excite nephritis, nor is this consistent with the rarity of the disease in South Africa and among the inoculated troops training at home.

The French Army surgeons report that there have been a certain number of instances where the disease was simulated by putting white of egg into the urine, and injecting water under the skin. They have also suggested that the disease was due to a suppressed form of scarlet fever. It is interesting to note that very few, if any, cases have occurred among the Indian troops, and the natives of India are said to enjoy comparative immunity from scarlet fever. It is also interesting to note that otitis media, so common in scarlet fever, developed just before the œdema in two of my cases. Sore throat was also not uncommon at the outset—seventeen of my fifty-eight cases complained of this. Mr. Mackenzie Wallis has made a comparative study of trench nephritis and scarlatinal nephritis and has shown many points of similarity, both in the lesions produced and in the characters of the urine. But we do not believe that the two are identical. If the same percentage of nephritis occurred in this presumed suppressed scarlet fever as in the ordinary type, this would mean that there had been about 10,000 cases of suppressed scarlet fever among the troops, which appears to me an impossible assumption. Moreover, even in "scarlatina *sine eruptione*" desquamation follows, which has not been observed in these cases.

A point which deserves consideration is the comparative rarity of the disease among officers.

The rapid increase in the number of cases in this War and in the American Civil War, starting about March in each case, and the close similarity between the individual cases suggest some common cause and one not operative in all wars. The simplest explanation would be a specific infection. In attempting to elucidate this, our first step was to try by chemical tests whether the nephritis was of the infective or toxic type. Some authorities claim that the infective type is glomerulo-tubular in distribution, while a toxic nephritis, such as that produced by corrosive sublimate is mainly tubular. I may say I am rather sceptical as to the value of this distinction, but so far as it is valid our results would point to the involvement of both glomeruli and tubules. I do not propose to go into details, but I may say that the tests we employed were the chloride test, the iodide test, the lactose test and the diastase test. Dr. Trevan carried out the first three, and was able to show that both glomeruli and tubules were involved, and Mr. Mackenzie Wallis found by the diastase test not only that there was tubular damage, but the degree of the damage could be estimated in this way, so that the test was a valuable aid in prognosis. The cases with a low diastase output after the cessation of albuminuria cannot be regarded as completely recovered, and are liable to relapse.

MORBID ANATOMY.

Professor Andrewes found in the few fatal cases evidence of a subacute diffuse nephritis. All the glomeruli showed signs of inflammation, and there was extensive damage to the convoluted tubules. The interstitial tissue was œdematous and infiltrated with lymphocytes and polymorphs. There was no fibrosis, and no micro-organisms could be found. Pyelitis was not found.

PATHOLOGY.

As there was thus complete evidence of glomerulo-tubular changes, an infective process was indicated. Search was made for this as follows :—

(*a*) *Blood Cultures* were sterile. There remained the possibility of a local infection, from which toxic products were disseminated. Attention was naturally next turned to the urine.

(*b*) *Cultures from the Urine.*—Catheter specimens were obtained in twenty-one consecutive cases and cultures made. In eighteen of these the urine proved to be sterile. From the three remaining cases *Bacillus* *coli* was obtained, but in two of them only with difficulty. I mention this specially, as Klein and Pulay in Vienna and MacWalter in Dublin lay stress on *Bacillus coli* as the causal agent. Our cultural and histological results are definitely against this conclusion.

(*c*) *Throat Cultures.*—Seventeen of the cases complained of a sore throat as an early or initial symptom. Tonsillitis is known to be associated with nephritis, so throat cultures were made from all the throats where soreness was complained of, and in several where no such complaint had been made. In every instance streptococci grew in abundance, sometimes in practically pure culture. Pneumococci were found in five, and diphtheroids and *Micrococcus catarrhalis* were also found in some cases. Before it could be concluded that the streptococci were responsible in any way, it was necessary that controls should be made, since streptococci are normal inhabitants of the throat. Dr. R. G. Canti therefore made cultures from the throats of ten soldiers with nephritis, ten wounded soldiers who had not got nephritis and ten male civilian patients of military age, suffering from various surgical diseases. He found that the soldiers' throats were, as far as bacteriological examination went, in a healthier condition than the civilians', while the throats of the soldiers with and without nephritis were closely similar. He also estimated the streptococcal antibodies in the blood of some of these cases, but found no evidence of any excess, which is an argument against the existence of a recent streptococcal infection.

We next made investigations as to infection by an ultra-microscopic filter-passer. Mr. Mackenzie Wallis has produced a definite illness in rabbits and monkeys after an incubation period of eight days by injections of urine prepared so as to be free from bacteria, but containing any filter-passer present. These results demand consideration, even though he has not succeeded in producing nephritis. For the latent period of eight days excludes a mere chemical cause for the illness and corresponds to the incubation period which has been estimated clinically in some cases. In this connexion the results with Wassermann's reaction are of interest. The reaction was positive in eighteen out of fifty-six cases, being strongly so in four and feebly so in three—i.e., it was positive in practically one in three, a higher proportion than that of syphilis in the Army in general. This may mean that men damaged by syphilis are more liable to nephritis, or that the positive reaction was not due to the *Spirochæta pallida*, but to some other animal infection, such as a filter-passer is generally assumed to be.

SIGNS AND SYMPTOMS.

I intend only to call attention to those features of the disease which seem peculiar to the present outbreak. But there is one point on which it is very important that we should get evidence from those medical officers who have seen cases in the early stages. There are a number of febrile conditions occurring among the troops, and it would be interesting to know whether acute nephritis is specially apt to occur among those who have had any such febrile attack. Lieutenant F. G. Chandler, Medical Officer to the Second Argyll and Sutherland Highlanders, told me that in several cases there had been diarrhœa of sudden onset, or a temperature of 103° F., with pain in the limbs and shivering for twenty-four to forty-eight hours, before he found albumin in the urine. Other medical officers have reported œdema without albuminuria at all. In the majority of cases, the first thing that the patient noticed was the œdema, which usually started in the face and legs and remained curiously localized sometimes, though more frequently it became generalized. Œdema was almost a constant feature, being present in fifty-three out of the fifty-eight cases, and of the five in whom it did not occur, four gave a history of previous nephritis. In all my cases the œdema soon cleared up.

One of the most striking points was the frequency of dyspnœa as an early symptom. It was definitely present in forty-nine cases. Of the nine who did not complain of it, two had no œdema, while the œdema was slight in two others. As a rule, the shortness of breath started at the same time as the œdema, but did not last so long. The alveolar CO_2 was determined by Dr. Trevan in five cases during the dyspnœa. In three it was normal, while in the remaining two it was reduced from the normal 5 to 3 per cent. Since dyspnœa due to acidosis is always associated with reduction of alveolar CO_2, and uræmic dyspnœa is of this type, it would appear that the shortness of breath was not always associated with acidosis, uræmic or otherwise. I do not think that dyspnœa is usually regarded as a common feature of acute nephritis, apart from uræmia or cardiac failure. But the majority of these cases were not so ill that either the kidney or the heart was failing, and none of them showed signs of cardiac dilatation. The close agreement between the onset of œdema and dyspnœa suggests that the outpouring of fluid into the lungs or pleural cavity may have been responsible for the shortness of breath. This is supported by the frequency with which a cough and bronchitis also occur. Some of the cases showed a return of respiratory distress after their journey from France.

A slight and irregular temperature was common in the earlier stages, and was sometimes prolonged where recovery was slow. The blood-pressure was very variable, being raised in some cases but not in others. I did not find that it was much help in prognosis, though probably the best thing is for the pressure to be raised at the beginning and soon to fall to normal. In the discussion at Vienna, Schlesinger noted a curious fact that in a great number of cases hypertrophy of the heart did not supervene.

I noted a great variability in the amount of urine secreted. Often it was markedly increased, while the disease appeared to be fairly acute—i.e., there was hyposthenuria or an inability to secrete a concentrated urine. It was certainly a more marked feature of these cases than in the acute nephritis met with in civil practice. I did not observe, even in early cases, the extreme reduction in the quantity secreted such as is usual in ordinary acute nephritis. Red blood corpuscles were found in forty-four of the fifty-eight cases—the amount was very variable; the urine was sometimes bright red with blood, sometimes merely smoky, and often chemical and microscopical tests were needed to detect the blood. As the hæmaturia cleared up there was frequently a flocculent reddish-brown precipitate in which the blood alone could be found. I was struck with the fact that, in a good many cases, blood continued to be poured out in some quantity long after all other acute symptoms had subsided, as though the damaged kidney continued to leak blood rather than that there was a hæmorrhagic inflammation of the kidney.

There was generally a considerable number of leucocytes in the urine, just as there was leucocytic infiltration of the kidney in the fatal cases. At first I thought this was a feature special to this form of nephritis, but Mr. Mackenzie Wallis finds that it is equally marked in scarlatinal nephritis. Casts were found in all but three cases; usually there was a mixture of epithelial, granular and hyaline casts. Blood casts and fatty casts, on the other hand, were uncommon. Crystals were rare in the urine. Calcium oxalate was found twice, and crystals of uric acid once. The rarity of organisms in catheter specimens has already been referred to.

As to complications, fits, presumably uræmic in nature, occurred in four of the fifty-eight cases. They all made a good recovery, and I was of opinion that free venesection contributed to this recovery.

Mr. Foster Moore examined the eyes of patients under the care of my colleagues and myself, and reported that he found retinal hæmorrhages in some of the acute cases, but that retinitis only occurred in those cases which had definitely become chronic. Captain Abercrombie has observed some interesting complications, bearing on a possibly infective origin, of which I hope we shall hear him speak this afternoon.

Milkiness of the blood serum, referred to by Bright in his original account of the disease, was not observed in any of the fifty-six cases in which the blood was drawn for Wassermann's reaction, but was present in a fatal case under Major Calvert's care.

COURSE AND PROGNOSIS.

On the whole, it may be said that the disease has run a favourable course, although I assume that I only got the more protracted cases sent home from France. A patient who developed the disease immediately after he returned from France on leave, and who was admitted to hospital on the second day of the disease, was free from albuminuria on the fourth day. Only one of the fifty-eight cases died, and in no other case did life appear to be in danger. Most of the men have felt quite well as soon as the œdema subsided, though some complained of headache, cough, and digestive disturbances for a week or more. Yet many of those who felt and looked quite well were still passing albumin, blood, and casts. As they recovered, the albuminuria often became intermittent, and there has been a curious tendency to remission and relapse. Some of those who had apparently recovered and had gone to convalescent homes soon relapsed. Often the patient has been able to tell from his own sensations whether the albumin has returned or increased. It took as much as fourteen weeks for the albuminuria to cease in some cases, and others continued to pass blood albumin even five or six months after the onset.

The diastase reaction in the urine is a valuable aid to prognosis. Not only are those cases worse in which the diastase output is lowered or absent, but if the lowered output persists after the albuminuria has ceased the patient seems liable to relapse. A case, therefore, cannot be regarded as cured until the diastase output has returned to normal, and I would suggest that it is important for this test to be done in all doubtful cases before return to duty. Schlesinger is of opinion that the subjects of hæmorrhagic nephritis are no longer fit for active service, though Strasser thinks that they may still be used for less strenuous military duties. On active service such patients are liable to relapse.

TREATMENT.

I will say little on this head, as I have really nothing fresh to add to our common knowledge. As nitrogen retention is a common feature of the early cases, I have adopted a diet poor in nitrogen, though varied and fairly liberal in carbohydrates and fat, for limited periods in the earlier stages. Sometimes this has produced distinct benefit, but sometimes it seems to make little or no difference. I am convinced that prolonged nitrogen starvation is as bad for the nephritic as for anybody else.

CONCLUSIONS AND SUGGESTIONS.

(1) These cases are true examples of acute nephritis, as shown by (*a*) the combination of œdema with albuminous urine containing casts; (*b*) the nature of the proteins in the urine; (*c*) the tests for renal permeability; (*d*) post-mortem evidence.

(2) The cases have been too prevalent to be merely accidental, and the close similarity of the symptoms suggests a common cause.

(3) Exposure, water supply, metallic poisons, or intestinal toxæmia can be excluded as the cause. The prolonged cases showed a high percentage of positive Wassermann reactions.

(4) The curve of incidence both in this War and in the American Civil War suggests an infective agent, as does the unequal degree to which the different units were affected. This is supported by the extent to which the glomeruli were involved, as shown by the chemical tests and the post-mortem evidence.

(5) So far, bacteria have not been found responsible for the infection, though more positive evidence might be obtained from earlier cases. Results suggestive of a possible filter-passer have been obtained, but they are not conclusive. The point of entrance of the infection is possibly the tonsils and upper air-passages. I suggest that there is a specific organism responsible which resembles, but is not identical with, that causing scarlet fever.

(6) The outstanding clinical features of the epidemic are: (*a*) The frequency with which shortness of breath occurred at the beginning, (*b*) the great variability in the duration, (*c*) the tendency to remission

and relapse, and (*d*) the ultimately favourable prognosis in the majority of the cases.

I would make the following suggestions :—

(1) That animal experiments with the saliva and urine from recent cases should be carried out. The lack of definite evidence so far may be due either to the infective stages being over before the patients reach England or to the difficulty in inducing nephritis in the animals employed.

(2) That investigations should be made as to the exact distribution of the cases. This might be done by means of maps, on which the cases could be dotted, according to the place of origin. There is an impression that certain billets are particularly associated with the disease. A map would afford valuable evidence as to the kind of place where the disease is contracted, and therefore as to the possible source of the infection. Until this is done it would be useless to try to isolate the cases; probably they are only infectious in the early stages, and are so no longer when they reach the base hospitals. Yet some may still be infectious, since orderlies at these hospitals have contracted the disease. In the meantime it might be well if the urine and sputa were treated as the excreta in the cases of typhoid.

(3) That arrangements should be made for the urinary diastase to be estimated in doubtful cases before return to duty is allowed.

I would urge that we have a remarkable opportunity of studying the pathogeny of nephritis in general and of rendering aid to the efficiency of our forces by checking a disease which incapacitates a number of otherwise healthy men. The next chapter in the inquiry will have to be carried out in France. I feel sure that anyone investigating the disease will find, as I have done, a sympathetic helper in Dr. Walter Fletcher, the Secretary of the Medical Research Committee.

PS.—Since writing the above, Sir John Rose Bradford's note on the subject has appeared in the *Quarterly Journal of Medicine* for January, 1916. It is gratifying to find that from a more extended number of cases he has come to conclusions practically identical with those I published in the July (1915) number of the *Journal of the Royal Army Medical Corps.*

Sir WILLIAM OSLER, F.R.S.

I am sure we have all listened to an exceedingly able and interesting presentation of a most interesting and unusual subject; for there can be no doubt that this is a disease which we have not seen before. Epidemic infectious nephritis has not, so far as I know, been described before, except in these cases to which Captain Langdon Brown has referred as occurring in the American Civil War. And I think we are very much indebted to Captain Langdon Brown, and also to Sir John Rose Bradford, for their admirable contributions on this subject, which will form the basis and starting point for all subsequent investigations.

The general clinical characters of the disease are those of nephritis, the onset being abrupt, without, as a rule, any previous disorder. Nearly all the men I have seen, in response to inquiry, say: "I was on duty, and a friend told me I had a swelling of the face," or "I noticed that my hands were swollen," or "I saw that my feet were swollen"; it is very much the mode of origin which we see in the ordinary acute nephritis of young adults, although this is rare in civil life. Secondly, there is the transient character of the œdema; a number of these men revealed it for only a day or two; one man had only a swelling of one side of his face for two days. Some have had swelling of the hands only, and there have been but few instances of general anasarca. Several of the fatal and otherwise more serious cases have had general anasarca, but that has been rare. Dyspnœa is unusual as an early feature in Bright's disease, but, as Captain Langdon Brown remarked, it has been an interesting peculiarity in these cases. Slight fever has been present in a few of the cases that have returned. As to how many have had it early in the disease we have no definite information; and in Sir John Rose Bradford's paper there are no accurate figures as to the number who had fever at the onset. The rapid improvement in the patients' condition and sensations with the disappearance of the dropsy has been remarkable. In the case of the great majority of these patients it has been difficult to keep them in bed, for by the time they reached the hospitals here they have felt well and are ready to get up, and are hungry; indeed, the only feature indicating the seriousness of their condition has been that found on examination of the urine. There have been certain peculiarities. Restoration to good health, with the persistence of a large amount of albumin, of blood, and of casts, with increasing high blood-pressure, is an unusual combination in the nephritis of civil life, yet that has been common enough in these cases. Several uræmic symptoms have been present without dropsy, with the passage of a full amount of urine. Early and persistent high arterial tension, out of all proportion to the general urinary features, has been present in a certain number of cases, and it has persisted even after the disappearance of the albumin and the blood from the urine. Cases of albuminuria with tube casts and blood have been admitted without a history of dropsy, and detection has only followed a routine examination of the urine, for they have never had the symptoms indicating tubal nephritis.

What I should like to speak of particularly is the question of prognosis. As a rule these cases are said to recover. The figures given in Sir John Rose Bradford's paper, and those you have heard just now indicate that the majority survive. And yet death has occurred in not a small proportion of the cases I have seen. For instance, out of 113 cases admitted to the Canadian Hospital at Taplow there have been two deaths. There were two deaths among the thirty cases admitted to the American Hospital at Paignton; and there has been one death in the cases at Oxford. So that I think if we could get the figures they would show a larger proportion of deaths than either Sir John Rose Bradford or Captain Langdon Brown would lead us to expect.

Of the three post-mortem examinations I have seen, in two the organs were sent to Dr. Andrewes, and he will speak of them. One was a case of typical acute Bright's disease: a large white kidney of most characteristic appearance; true milky-white large kidney, not a speck of blood in the cortex, and no venæ stellatæ; a kidney exactly resembling that figured by Bright as coming from his patient Izzard, except that he figures there, for the first time, the venæ stellatæ on the surface of the organs. But in my case there were no prominent veins on the surface; the entire cortex was as white as milk—not yellow—and without any signs of fatty degeneration.

The second case, sections from which are on view here, was also very interesting, because it was one of acute nephritis engrafted on old disease. Under the microscope there is an interesting section showing a capsule and glomerulus, with fibroid change, and a capsule and glomerulus next to it with an acute process.

The third case was interesting because the patient died of an intercurrent disease. He had very severe dropsy, intense hæmorrhagic nephritis, which was subsiding, between the fifth and sixth week, but he had pleuro-pneumonia, of which he died. He was aged 40, and had been an old soldier; he had sclerotic arteries, with sclerotic changes in the valves of his heart. The kidneys were uniformly reddish-brown in colour, and there were marked tubular and glomerular changes.

Two cases occurred at Paignton, and they were instances of very severe uræmia. Both were in a critical condition when admitted, and both proved fatal very rapidly, with diminishing urine, and with very severe toxic and uræmic symptoms. Unfortunately, in neither of those cases was there a post-mortem examination.

The question of prognosis is of great importance. A not inconsiderable proportion of the cases at present under treatment in our hospitals will, I am afraid, become chronic; that is to say, the cases which are lasting from twelve to fourteen weeks. I have always held it to be a safe rule, in a case of acute nephritis, that if the urine does not clear by the end of the twelfth week, the chances are that it will become subacute or chronic. There are at present, in the Canadian Hospital at Taplow, about thirty cases. Fifteen of those have been in for a couple of days only; they came in a convoy together. Yesterday I went very carefully over the fourteen cases which have been in the hospital for a considerable time. I have been seeing these cases from week to week, and I have been much surprised to find evidence of persistence of the nephritis in all those patients who have been more than nine weeks ill—i.e., out of the fourteen cases there was only one without red blood corpuscles in the urine. One man, an Australian, in the sixteenth week, not only had red blood corpuscles after centrifugalizing, but macroscopically he was seen to have large quantities of blood. Another case also has the characteristic features of Bright's disease. Nine of these cases have high blood-pressure, that is, above 170 mm. Those patients aged over 39, six in number, bear out the point that Sir John Rose Bradford makes, that in a considerable proportion of them it is acute nephritis engrafted on kidneys which have been already damaged. In those six the blood-pressure is high, and there are signs of commencing arterial change. In ten of the fourteen cases the urine is of low specific gravity. Therefore, taking into consideration that low specific gravity, together with the persistence of the red blood corpuscles, tube casts and albumin in the urine, I fear that a considerable proportion of them will never have complete restoration of the kidney function, though, with the exception of two, the patients both look and feel well. So I would say we must not take so rosy a view of trench nephritis (this epidemic nephritis) as Sir John Rose Bradford suggests in his admirable paper. I believe that a considerable proportion of the cases we have at present under observation will pass on to the chronic stage.

Dr. F. W. Andrewes, F.R.S.

I propose to confine my remarks to the histology of trench nephritis. I have had the opportunity of examining six cases, and I have brought a number of sections which are shown under the microscopes, together with two sections of scarlatinal nephritis for comparison.

It is difficult to obtain specimens of the early stages of the disease. In this country we get chiefly the more severe and advanced cases invalided home, and only one of the specimens shown is from an early case supposed to be trench nephritis. This is material sent to me from France by Sir Wilmot Herringham. A soldier, aged 25, found unconscious in the road, died shortly afterwards, and was found to have cerebral hæmorrhage. Urine, withdrawn by catheter before death, was found to be albuminous and to contain blood and casts; the patient had marked general œdema. There was thus clinical ground for supposing him to have acute nephritis, but of what duration I do not know. The kidneys were of normal size and deeply congested, dripping blood. Microscopically I cannot find in them any sufficient evidence of a true nephritis; there is extreme venous and capillary congestion and blood in some of the tubules. There is no sign of a glomerulo-nephritis; the tubular epithelium is perhaps slightly swollen and irregular, but stains well and shows no desquamation; there is no interstitial infiltration. The changes are not greater than I should expect to find in the kidney of a previously healthy man dying in convulsions and coma from cerebral hæmorrhage, and this is a curious thing in view of the clinical evidence of acute nephritis.

Four of my remaining cases are typical examples of subacute nephritis commencing acutely in the trenches, and dying from four to twelve weeks after onset. Two died of uræmia, one of extreme dropsy, with dypsnœa, and one from vomiting and hæmorrhages. These cases appear to be representative of the severe form of trench nephritis, and they all show the same thing—a mixed nephritis involving the glomeruli, the tubular epithelium, and the interstitial tissue. The changes are advanced in proportion to the duration of life.

The glomeruli show proliferation of the epithelium in Bowman's capsule, which in the earlier cases is inconspicuous, or conspicuous only here and there. Later there are the usual crescents of proliferated epithelium, and when the case has lasted two or three months, some of the glomeruli show commencing fibrosis and atrophy.

The epithelium of the convoluted tubules shows the usual degeneration and desquamation. Many of the tubules are choked with epithelium, leucocytes, blood, and casts. In the cases I have examined fatty changes have been slight or absent.

There is always some cellular infiltration in the interstitial tissue, and sometimes it is very conspicuous, but in none of my cases has there been time for it to pass on to fibrosis. The cells forming this infiltration are sometimes lymphocytes and sometimes polymorphonuclear leucocytes: I have failed to demonstrate plasma cells. In the first case I examined leucocytes had been so abundant in the urine as to form a visible sediment of pus at the bottom of the specimen glass, and in this case there was an exceptionally rich infiltration of the kidney with polymorphonuclears. We had suspected a pyelitis, but none was found post mortem. In another case the capillaries of the kidney were found stuffed with many polymorphonuclears.

Vascular congestion is present in all my cases, but more marked the earlier the case.

The sixth case I have examined—one of two kindly sent me by Sir William Osler from the Canadian Hospital at Taplow—is an example of old-standing nephritis of three years' duration, upon which a more recent nephritis seems to have been superimposed. That is to say, there is some old fibrosis, and some glomeruli are atrophied and fibrotic, while others show recent epithelial proliferation and a few foci of cellular infiltration.

It will be seen that in what I have described there is nothing to distinguish trench nephritis from other forms of the acute and subacute disease. I was at first inclined to believe that the abundance of polymorphonuclear leucocytes in the urine and renal tissues was peculiar, but much the same seems to be the case in scarlatinal nephritis. I have carefully compared the scarlatinal kidney with the kidney of trench nephritis. There are, of course, two very different renal lesions in scarlet fever, and I have shown examples of each this evening. One is the profuse interstitial infiltration with plasma cells and lymphocytes seen in certain septic cases of the disease, without any glomerular changes; there is no analogy between this and trench nephritis. The other is the acute glomerular nephritis of the third week in scarlet fever, and this seems to me in all respects like the trench disease. Histology, therefore, does not seem to help us in solving the problem.

I have failed to find any micro-organisms in the kidneys I have examined, and this is in accord with our bacteriological findings in the urine of the cases which we have had at St. Bartholomew's Hospital. Catheter specimens have almost always proved sterile to ordinary culture.

Mr. R. L. Mackenzie Wallis.

The observations I am about to mention have been carried out at St. Bartholomew's Hospital for the Medical Research Committee, to whom I would express my indebtedness for making all the arrangements for placing cases at my disposal, and also for defraying the expenses connected with this work. Many of the cases referred to in this paper were under the care of Captain Langdon Brown, and the clinical aspects of the disease in question have been already published in the *Journal of the Royal Army Medical Corps* for July, 1915. All the investigations have been directed along two main lines—namely, the establishment of the true nature of the disease and the possible source of origin. So far very few pathological observations have been recorded on this disease, and apart from those carried out at St. Bartholomew's Hospital I am not aware of any others except those emanating from Germany and Austria. With regard to the former line of inquiry, attention has been paid more particularly to the variations in the diastatic activity of the urine as an index of renal function, the extent of renal damage, and the rate of recovery. The possible origin of the disease has been approached from two points of view—namely, the question of a coexistent toxæmia, whether of mineral or parasitic origin.

The Chemical Changes observed in the Urine, and their Value as an Index of Renal Function.

This work has been based upon the records of an investigation of renal diseases which has been pursued in my laboratory for the past two or three years. Especial attention has been paid to the variations in the diastatic activity of the urine under pathological conditions, particularly in pancreatic and renal diseases. In the presence of the former the diastase output is greatly increased, but if renal permeability is diminished the amount of diastase present is markedly subnormal. Under normal conditions the diastatic activity of the urine is found to lie within certain narrow limits, and in my own method of estimation amounts to between 10 and 22·2 units. In all cases of nephritis, whether of the acute, chronic interstitial, or parenchymatous type, much lower values generally obtain—usually 5 units or less, and perhaps even 0. Cardiac diseases, on the other hand, generally give normal values, except at times where there is lack of compensation, and then low readings obtain. Apart from this I have not met with any other disease where such low values prevail for the diastatic activity of the urine as in cases of renal disease. It is of interest to note in passing that the various toxic kidneys, such as are seen in the albuminuria of pregnancy, eclampsia, and hyperemesis gravidarum, give very high values for diastase in the urines, and where proteins are present in relatively large quantities.

In all, fifty cases have been examined, and the results show that the diastase values were below normal in thirty-one instances, giving a percentage of 62. The remaining nineteen cases giving normal values were all convalescent, and many showed no albuminuria, or only faint traces. In no case was a high diastase value found amongst the whole series, which is of interest in view of the observations made above with regard to the so-called "toxic kidneys" associated with pregnancy. Of the thirty-one cases of the series giving low values eight had no diastase at all, two 2·2 units, two 2·8 units, five 3·3 units, and thirteen 5 units. These cases represent all the stages of the disease as met with in the military wards of St. Bartholomew's Hospital, and the results bear no relation to the actual interval between the onset of the disease and the actual date of the examination. There is, however, a definite relationship between the severity of the case and the diastase content of the urine. Not only do the more severe cases present low values, but it is found that where these low values persist there is evidence of more permanent damage to the kidneys, since these patients show liability to constant relapses. It is of interest to note that even after the albumin has disappeared low values for the diastase are obtained in these cases. The estimation, therefore, appears to be of value, not only in indicating the extent of kidney damage, but also in making a prognosis. The question arises as to why such low values obtain in nephritis and in no other condition. From all the available evidence it seems reasonable to assume that this ferment is excreted by way of the renal tubules, and any damage to the functional activity of these renal elements results in a depression of their permeability to this ferment. The results under this heading indicate that there is definite damage to the secreting tubules of the kidneys in this disease, and the actual values give an indication of its extent.

The Nature of the Proteins present in the Urine.

All the various protein tests have been applied to the specimens from time to time, and the actual amount of protein in the urine determined. From the chemical reactions it was at once obvious that we were dealing with ordinary serum albumin and serum globulin, as usually met with in inflammatory affections of the kidneys. There has been no evidence of the presence of any other proteins such as nucléo-proteins, mucins, Bence Jones protein, altered globulins, or albumoses and peptones. The optical properties of the urines were determined by the polarimeter, and were found to behave just like the ordinary albuminuric urines met with in nephritis, being relatively optically inactive. This result is in direct contrast to that found in cases of functional albuminuria, or in the so-called "leaky kidneys." Additional evidence is provided by the estimation of the serum albumin and serum globulin content in certain cases. The serum albumin was always in excess of the serum globulin, and the ratio of albumin to globulin was found to range from 5 to 1 to 6 to 1. This value is again in accordance with all previous observations upon inflammatory conditions of the kidneys. From the actual amount of protein excreted, and the relative distribution of the two types of protein found, it appears that we are dealing with a true inflammatory condition, which is chiefly tubular in origin. The actual amount of albumin present was found to vary very considerably, usually from a trace up to 0·3 per cent., as estimated by Esbach's method, but higher readings, such as 0·5 to 0·8 per cent., were obtained occasionally. Substituting the Aufrecht method of estimation figures ranging between 0·001 to 0·3 per cent. were obtained.

The Microscopical Examination of the Urine in Cases of Trench Nephritis.

Fresh red blood corpuscles were invariably found when any trace of blood was present. In some cases the urine was bright red with blood, sometimes merely smoky, and often only a few red blood cells were detected microscopically. A common appearance was the settlement of a flocculent reddish-brown precipitate, in which alone the blood could be detected. The chemical tests showed without doubt that the guaiacum test for blood was not reliable, but the much more delicate phenol-phthalein test has been used with success. Not only does this test reveal the merest traces of blood, but the resulting pink colour gives one a rough index of the amount of blood present.

White blood corpuscles were present in almost every specimen, and varied in amount in different cases. As a general rule, particularly in the early stages of the disease, there was a definite increase in the number of polymorphonuclear leucocytes present. This appears to be a distinct feature of this type of nephritis, and with the exception of scarlatinal nephritis I have not met with such an excess in any other form of renal disease. It is of interest to note that in both conditions white blood corpuscles were found in the centrifugalized deposit, even after all traces of albumin had disappeared from the urine.

Isolated renal cells and cells from the genito-urinary tract were also met with in the microscopical examination.

Casts were present in practically every case, a mixture of epithelial, hyaline, and granular forms being usually found. Blood casts and fatty casts were of extreme rarity. The following figures give the relative abundance of the different types of casts met with in the cases under examination : Hyaline casts, 33 ; epithelial casts, 36 ; granular casts, 51 ; fatty casts, 7 ; blood casts, 2. It may be noted that in the more acute cases hyaline casts were very common and epithelial casts rare. This has been my experience also in the cases of scarlatinal nephritis which I have examined.

Films prepared from the centrifugalized deposit showed very few organisms, and they were never abundant. The chief forms were *Bacillus coli* and the *Streptococcus urethræ.*

Crystals were of great rarity, and only in a few specimens were calcium oxalate or uric acid crystals detected.

Microscopically, therefore, we note the constancy of the presence of casts of various types and a constant excess of white blood corpuscles. The latter is one of the chief points revealed by such an examination, and comparison should be made with the observations on scarlatinal nephritis given below.

The Retention of Nitrogen in the Blood and Cerebrospinal Fluid.

In determining the diastatic activity of the urine, it appeared to be of interest to ascertain the chemical changes in the blood and cerebrospinal fluid, to ascertain whether there was any correspondence. For this purpose use was made of the urease method of van Slyke for estimating the urea in the blood and cerebrospinal fluid. The principle of the method depends upon the conversion of the urea present into ammonium carbonate by the ferment extracted from the soya bean, and the subsequent estimation of the ammonia by aeration into acid. This method is quite easy to perform and gives extremely accurate results. All that is required is 2 c.c. to 3 c.c. of blood and 1 c.c. to 2 c.c. of cerebrospinal fluid. Under normal conditions it is found that the urea content of the blood ranges between 0·02 grm. and 0·05 grm. per cent. In cases of acute nephritis the urea content of the blood is found to vary with the severity also with the duration of the disease. When there is evidence of marked renal insufficiency the urea content of the blood rises to 0·1 or 0·15 per cent., and this corresponds with a great diminution in the diastatic activity. As the symptoms subside, the diastase returns to normal before the urea content of the blood assumes a normal value. Thus we see the value of combining the two estimations, since we are able to ascertain with some degree of certainty the condition of renal sufficiency at the time of examination. This appears to be a matter of some importance in the present epidemic in deciding whether convalescent cases are fit to return to military duty. The diastatic activity of the urine has been used for purposes of prognosis, as will be seen from the observations recorded above. A normal diastase value appears to indicate that there is very little permanent damage to the kidneys, but at the same time such a case often shows some degree of nitrogen retention, as evidenced by the urea content of the blood. Under these circumstances it appears advisable to carry out both determinations before coming to any definite conclusions.

The cerebrospinal fluid also has been investigated, particularly in patients with uræmia, the spinal fluid from other cases being used for control purposes. The cerebrospinal fluid is a particularly favourable medium for estimating urea by the urease method, and I have obtained very reliable results and controls in this way. In all cases of uræmia the cerebrospinal fluid has shown a raised urea content as estimated by this method.

Case	Blood		Cerebrospinal fluid		Urine diastase
	Urea	Non-protein nitrogen	Urea	Total nitrogen	
Acute nephritis	0·06	—	—	—	10·0 units
,, ,,	0·02	—	—	—	22·2 ,,
,, ,,	0·02	0·049	0·04	0·061	10·0 ,,
,, ,,	0·04	—	—	—	10·0 ,,
Uræmia	—	—	0·066	—	—
,,	—	—	0·178	—	—
,,	—	—	0·41	—	—

The results, though few in number, are suggestive, and evidence is being accumulated at the present time definitely to establish these points.

The Characters of the Urine in Scarlatinal Nephritis as compared with those met with in Trench Nephritis.

Since the question of scarlatina has been raised as the cause of this epidemic of nephritis, particularly by our French colleagues, it was deemed advisable to investigate this type of nephritis along the same lines. It has been suggested that trench nephritis represents a suppressed form of scarlet fever. The data obtained among civilians in fever hospitals in Great Britain point to the occurrence of this complication of scarlatina in about 10 per cent. of the cases, and this would entail the occurrence of scarlet fever amongst 10,000 troops up to the end of June, 1915, based upon such figures. We know, however, that an epidemic of such magnitude did not occur, and further no evidence of desquamation has been observed in any of the cases of trench nephritis examined. It is of interest to note that the Indian troops have been singularly free from nephritis—a point worthy of note when we are told that natives of India are comparatively immune to scarlet fever. Through the kindness of Dr. Thomson, Medical Superintendent of the North-Eastern Hospital, I have been able to examine a number of cases of scarlatinal nephritis under his care. The results of this work are best demonstrated by reference to the following table of comparison between the two forms of nephritis:—

TABLE SHOWING SYNOPSIS OF CHARACTERS OF TRENCH NEPHRITIS AND SCARLATINAL NEPHRITIS.

	Trench nephritis	Scarlatinal nephritis
Past history ...	No history of scarlet fever	Rarely history of previous attack
Symptoms :—		
Headache ...	Frequency of severe headache amongst first symptoms	Common
Vomiting ...	Attack often ushered in by vomiting for a few days	Common feature
Sore throat ...	Common	Very common
Shortness of breath	Marked	Very rare
Desquamation of skin	Not observed	Generally present

Table continued.

	Trench nephritis	Scarlatinal nephritis
Signs :—		
Temperature	Fluctuating temperature up to 103° F.	Rise of temperature frequent at onset of nephritis
Œdema	Generally localized to face or legs	Usually localized
,, (duration of)	May last four to five days, sometimes longer	Generally disappears quite rapidly
Ascites	May occur	Not common
Bronchitis	Prevalent	Not common
Heart	Normal	Normal
Urine :—		
Reaction	Acid	Acid
Appearance	Dark-coloured	Generally pale-coloured
Volume	Variable	Variable
Albumin	Often in quantity, 0·001 to 0·3 per cent.	Often in quantity, 0·001 to 0·4 per cent.
Duration of albuminuria	As a general rule rapidly disappears	As in trench nephritis
Blood	In the form of fresh red blood cells	As in trench nephritis
Duration of hæmaturia	Sometimes persistent	Tends to disappear except in severe cases
Microscopical characters of urine :—		
Casts (hyaline)	Very common in acute cases	Predominant form
,, (granular)	Present in later stages of the disease	Predominant form
,, (epithelial)	Occasionally present	Rare
,, (fatty)	Rare	Rare
White blood cells	Present in large numbers in centrifugalized deposit and persist after casts have disappeared	As in trench nephritis
Cultural characters	Invariably sterile	Invariably sterile
Chemical characters of urine :—		
Retention of nitrogen	Present	Present
Retention of chlorides	Present	Present
Diastatic activity	Subnormal in acute cases, rises to normal during convalescence	Subnormal in early cases and rises to normal in convalescence
	Patients with persistent low diastase show a prolonged convalescence	Subnormal in early cases and rises to normal in convalescence, but often low in fatal cases
Effects upon animals	Intravenous injection of urine produces illness in rabbits and monkeys on the eighth day following injection	No such effect
Toxicity of urine	Very marked	Less marked
Death :—		
Uræmia	Fits, convulsions, subnormal temperature; may recover	Less marked, but generally fatal
Hæmorrhage	Fatal termination in hæmorrhage, almost purpuric in nature	Not so common
Renal changes	Kidneys have typical appearance of acute or subacute nephritis, passing on to the stage of large white kidneys	Typical acute nephritis in cases developing this complication in the third week of the disease
Microscopical characters of kidneys	An acute glomero-tubular nephritis with marked tubular damage	An acute glomerulo-tubular nephritis, in some cases the changes being more marked in the glomeruli, in others the tubules

The Possible Origin of the Acute Inflammatory Changes in the Kidneys in Acute Nephritis.

(1) The question of intestinal toxæmia.

The possible origin of the disease from this source has been put forward, and it was therefore necessary to prove or disprove this hypothesis. An excessive protein diet was regarded as exerting a toxic influence in virtue of the putrefactive products arising from a coexistent intestinal toxæmia. Among the more striking of these products is indican, a substance readily recognized in the urine; but suffice it to say no more than the normal traces could be detected in the urine in these cases. The putrefactive bodies are largely combined with sulphates and excreted as ethereal sulphates, indican being merely one of these. With intestinal intoxication the ethereal sulphates rise both absolutely and relatively, and instead of the ethereal sulphates forming one-tenth of the total sulphates, much higher figures are obtained. In every case investigated, the ethereal sulphates were low (0·01 grm. and 0·21 grm.), and the proportion of ethereal sulphates to the total sulphates showed no increase. The associated urobilinuria in intestinal putrefaction was not observed. On this question, therefore, the present state of our knowledge will allow us to make a pronouncement on the absence of intestinal toxæmia.

(2) The question of a general toxæmia of a mineral, or of parasitic origin.

(*a*) *Mineral Poisoning.*—The amount of diastase in the urine in experimental poisoning with the heavy metals has been determined, and found to be invariably subnormal. Since these metals interfere mainly with the tubular functions of the kidney, it is reasonable to suppose that the diastase in the urine is excreted by this route. There has, however, been no evidence of any heavy metals in the urine in these cases, and the general characters of the disease appear to be unlike those met with in poisoning by such agencies. In only one case in civil practice have I met with a true nephritis due to mercurial poisoning, and the urinary analyses were quite different to those recorded above. The diastase content was markedly subnormal: there was a relative excess of serum globulin, the ratio of albumin to globulin being 3 to 1, and the proteins were optically active. We should expect that if the cases in question were due to metallic poisoning there would be a preponderance of casts showing fatty degeneration. These fatty casts, on the other hand, are of extreme rarity amongst the cases examined. To exclude any mineral poisons some of the tablets used for sterilizing the water in the soldiers' water-bottles were examined. No traces of arsenic or mercury could be detected. It was thought possible that if this acute nephritis was produced by mineral poisons, small quantities of the mineral or minerals in question could be detected in the urine of such cases. In order to determine this point, the urine from certain acute cases was subjected to ultra-filtration through collodion membranes, quantities varying from 2 to 4 litres being driven through collodion sacs under a pressure of 2 mm. of mercury. I have found that by such a method all the colloidal substances in the urine, the toxins, and mineral salts are retained in the sacs, and several litres of urine may thus be concentrated down to 30 c.c. in a very short time. My experiments with pure solutions of mineral salts have shown that it is possible to detect as little as one part of arsenic (As_2O_3) in one million parts of water, and some of the heavier metals, such as mercury, lead, and antimony, in even higher dilutions. In all the urines obtained from cases of trench nephritis no evidence of any mineral poisons could be obtained when this method was used. Under the circumstances mineral poisons as a possible cause of the disease must, I think, be ruled out.

(*b*) *Parasitic Origin.*—The records obtained by Professor Andrewes all point to the lesion in the kidney being one of a true acute nephritis, and there was nothing to suggest that the nephritis was of any distinct or unusual type. Further, no micro-organisms could be found in stained sections of the kidneys examined. Steps were therefore taken to ascertain whether any infective agent could be detected in these cases. Blood cultures have been made in several cases, but with negative results. Lieutenant-Colonel M. H. Gordon very kindly made both aerobic and anaerobic blood cultures, but did not obtain any positive findings. He also tested the sera of these cases against his three types of meningococci, but did not find any specific agglutinins. Complement-fixation tests against the streptococci isolated from the throats of these patients similarly yielded no proof of the presence of excess of streptococcal antibodies.

Catheter specimens of the urine from a large number of cases in the early stages of the disease were examined, and found to be invariably sterile. In only a few was *Bacillus coli* isolated, and in these only when 1 c.c. of urine was taken. The same results were true of urine which I obtained from acute cases on visiting Boulogne last summer. Lieutenant-Colonel Gordon also obtained identical results in some of the urines which he cultivated both aerobically and anaerobically.

The examination of the throat cultures made by Dr. Canti, and already referred to by Captain Langdon Brown, did not yield any features characteristic of the disease in question. It having been proved that there was no simple toxic agent nor an intestinal toxæmia in these cases, the origin of the disease appeared to be connected with some unknown infective agent. All the evidence so far adduced seemed to point to such an origin: for example, the curve of incidence, the clinical aspects, the degree of affection of the glomeruli, and the post-mortem evidence. In view of these findings, animal experiments were instituted with the object of reproducing the disease, if possible.

The material for such experiments was obtained from acute cases, the blood serum, cerebrospinal fluid, and urine (catheter specimens) being used. One striking feature was at once observed, and that was the remarkable degree of toxicity of the serum and urine from such cases, the intravenous injection of even 5 c.c. of sterile filtered urine into a rabbit weighing over 1 kilog. being sufficient to kill the animal in a few minutes. This quantity is very much less than that given by Bouchard both for normal urine and for urine from cases of nephritis. It was also found that the same toxic effects followed the injection of urine concentrated by ultra-filtration through collodion sacs. A series of experiments was then carried out to determine the nature of this toxic agent. The albumin in the urine, potassium salts, mineral salts of the heavy metals, were all excluded as possible agents. Now there was one striking feature met with in all the acute cases which, so far, I have not observed in any other types of nephritis, and that is the marked degree of pigmentation of the urine. This brown pigmentation was present quite apart from any contamination with blood, and the actual volume of urine passed in the twenty-four hours appeared to make no difference. In the less acute cases, and also in those which were convalescent, this pigmentation did not occur. There was no evidence of urobilin, hæmatoporphyrin, or aromatic derivatives in sufficient quantity to account for this abnormal coloration of the urine. The estimation of the sulphates in such urines as given above brought to light the interesting fact that all such specimens gave rise to dense pigment formation on hydrolysis with acids. The benzidine sulphate precipitate carried down with it a deep blue-black pigment, which proved to be indigo. So intense was this pigmentation that it was found necessary to remove it by blood charcoal before carrying out the estimations. Attempts were therefore made to isolate this pigment, but, in view of its great instability, these have presented so far an insurmountable difficulty. Suffice it to say that in the fresh state the fraction of the urine containing this substance is markedly toxic to animals. Steam distillation, distillation *in vacuo*, aeration, and filtration did not remove or in way destroy the toxic action of this elusive body. In an investigation I made in 1911 on indol derivatives in the urine, I came to the conclusion that under certain conditions the indol ring was synthesized in the body, and indol in the urine did not necessarily imply intestinal putrefaction. We know that indicanuria is frequently associated with intestinal toxæmia, but is present in even a more marked degree in cases of peritonitis, empyema, or where any septic focus exists. Now indol derivatives are generally converted into indoxyl compounds, and these combine with sulphates and appear in the urine as ethereal sulphates. From the evidence I have obtained in a large number of pathological conditions, I am inclined to think that this synthesis of ethereal sulphates takes place in the kidneys. Should the kidneys be affected by disease, this synthesis either does not take place or is considerably interfered with. As a result, the ethereal sulphates are not formed in any appreciable quantity, and this is borne out by the estimations carried out on cases of nephritis. The indol derivatives must therefore either be excreted in some other form, or be retained in the blood. In chronic interstitial nephritis very little indol appears to be formed, and the same is true of parenchymatous nephritis and also scarlatinal nephritis, as will be pointed out later in this paper. We appear, therefore, to be dealing with quite a distinct feature in trench nephritis, which leads me to add this as an additional argument in favour of an infective agent. Now the animal experiments illustrate very well the marked degree of toxicity of the urine of trench nephritis, far greater than that of normal urine, or even urine from cases of scarlatinal nephritis. This excessive indol formation is the one chief feature of the urine which serves to differentiate trench nephritis from all other forms of acute nephritis; and herein we appear to have an explanation of the toxicity of such urines. The serum from early cases of trench nephritis was also markedly toxic. It is of interest to note in passing that it is just this same fraction in the serum of patients with uræmia which exerts such a profound toxic action on animals. I have so far not succeeded in isolating any indol derivative from the cerebrospinal fluid of cases of uræmia, and this fluid appears to have little or no toxicity towards animals. In all probability, if present at all, it is so in too small a quantity to exert any action. There seems little doubt, therefore, that we are dealing in the acute cases with a powerful toxic agent, which is circulating in the blood serum and excreted in the urine. Such an agent would in my opinion explain many of the clinical features met with in this disease, such as the shortness of breath, severe headache, and hæmaturia. Now this feature of the urine was present in all the early cases, and it was quite absent from any cases of scarlatinal nephritis which I have examined, and constitutes one of the chief points of difference between the two types of nephritis.

We shall see, however, that there is an excessive number of white blood cells (polymorphonuclear leucocytes) in the urine in both conditions, and this in itself is sufficiently striking to warrant investigation. I have endeavoured to ascertain whether such an occurrence is a constant feature of acute nephritis, no matter what the exact origin of the disease. In none of my own records can I find any evidence that white blood cells are found in quantity in toxic cases, or in nephritis resulting from mineral poisoning. The case records at St. Bartholomew's Hospital during recent years also bear out this statement. Here, then, we have a most singular feature, and one that seems to point strongly to an infective agent. It will be seen that the majority of the catheter specimens of urine are sterile, and that no one organism has been isolated from the urine of cases of trench nephritis at any stage of the disease. The urine therefore contains only the resulting products of the bio-chemical activity of an organism or group of organisms, or the organism itself in a form incapable of detection by the ordinary means at our disposal. In order to establish this question on an experimental basis a number of animal experiments were instituted. The urines from acute cases of the disease whenever available were employed, and attempts were made to reproduce the disease in rabbits and monkeys by this means. As will be seen by reference to the table of results (pp. xxxii-iii), certain constant findings were obtained, although there was no instance of nephritis being produced in the experimental animals. The serum and the urine produced well-marked toxic effects following injection of small doses of urine, which soon passed off. The animals then remained quite well until the eighth day, when they were taken ill, and in two instances died on the tenth day with albuminuria. Post-mortem evidence did not reveal any pathological changes in the kidneys in such cases, at least it was insufficient to be recognized by histological examination. These results were obtained with catheter specimens of fresh urine either injected direct or previously filtered through a Berkefeld filter. Concentration of the urine by ultra-filtration demonstrated that the concentrate—i.e., the fluid remaining inside the collodion sac—was capable of exerting the same effects, but to an even more marked degree. It will be noted that this action was lost if the urines were allowed to stand for some time, or if previously heated to 55° C. for half an hour. Now these results may be explained either by assuming that the toxic agent was responsible for all the changes observed, and that owing to its instability its action was lost after standing or heating to 55° C., or that some organism was present in the urine of the nature of a filter-passer. Although a filter-passer cannot be definitely excluded, much further work is required before any conclusions can be drawn from these experiments.

Summary and Conclusions.

The main features of this work on acute nephritis have already been summarized by Captain Langdon Brown, so that further discussion of such points is rendered unnecessary. The disease in question is not a "new disease" as some writers have urged, but is a true acute nephritis, as shown by clinical, chemical, and histological evidence. Many of the cases exhibit evidence of extensive renal disease, characterized by the passage of quantities of blood and casts in the urine. The disease appears to be one of comparative rarity in civil life, but prevalent in war, as seen by the records of the American Civil War and by the fact that the German and Austrian armies have also been affected in this present War. This disease is therefore not merely accidental, but represents one with similar symptoms distributed over a large area, and suggests that there is some common causal agent responsible. Having established the fact that the condition is one of true acute nephritis, by the microscopical characters of the urine and tests for renal permeability, certain well-known causes of acute nephritis in civil practice had to be investigated. Thus the question of mineral poisons, intestinal toxæmia, direct bacterial infection (pyelo-nephritis), and some septic foci have been excluded, as will be seen from the evidence adduced above. There are, however, especially among German writers, certain advocates of the theory that typhoid inoculation is responsible. It is very difficult to find any facts to support such a contention, particularly as bacilluria was present in only a very few cases, and we have no evidence of previous attacks of dysentery, paratyphoid, or typhoid fever. The histological evidence does not support the view that the renal changes are set up either by an ascending infection or by direct blood infection, and therefore such a view appears to be merely hypothetical. Again, TABLE SHOWING RESULTS OF ANIMAL EXPERIMENTS.[1]

No. of experiment	Animal	Source of material	Method of injection	Amount injected	Toxic effects following injection	Subsequent progress	Post-mortem evidence
(1)	Rabbit	Urine concentrated by ultrafiltration; acute case	Intravenous	2 c.c.	Marked	Albuminuria six days after injection; died tenth day	No histological evidence of nephritis
(2)	Rabbit	Urine concentrated by ultrafiltration; acute case	Intravenous	2 c.c.	Marked	Albuminuria six days after injection; died tenth day	No histological evidence of nephritis
(3)	Rabbit	Urine concentrated by ultrafiltration; acute case; filtered and heated to 55° C. for half an hour	Intravenous	2 c.c.	No ill-effects	Recovered	—
(4)	Rabbit	Opalescent serum from an acute case; passed through Berkefeld filter	Intravenous	2 c.c.	Very little	Taken ill on eighth day; recovered	—
(5)	Rabbit	Cerebrospinal fluid from an acute case with uræmia	Intravenous	5 c.c.	No ill-effects	Recovered	—
(6)	Rabbit	Serum from an acute case; quite clear	Intravenous	2 c.c.	Slight toxicity observed	Acute illness on eighth day; rapid recovery	—
(7)	Rabbit	Catheter specimen of urine, sterile; from acute case	Intravenous	20 c.c.	Animal seized with convulsions and died in half an hour	... ...	Nothing abnormal found
(8)	Rabbit	Catheter specimen of urine, sterile; from acute case	Intravenous	10 c.c.	Marked toxicity observed	Illness on eighth day; died three weeks later from cerebral hæmorrhage	No lesions found in kidneys
(9)	Rabbit	Catheter specimen of urine from another case in early stages of the disease; sterile	Intravenous	10 c.c.	Animal died in ten minutes	—	—
(10)	Rabbit	Catheter specimen of urine from another case in early stages of the disease; sterile	Intravenous	5 c.c.	Well-marked toxicity	Ill on eighth day; recovered; no albuminuria observed	—
(11)	Rabbit	Catheter specimen of urine from an acute case	Intravenous	5 c.c.	Animal died in a few minutes	... ...	No abnormality found

(12)	Monkey	Same urine as used in Experiment (9) above	Intra-peritoneally	10 c.c.	Severe illness in twenty-four hours	Eighth to ninth day definite meningismus; temperature raised, rapid pulse; recovered	—
(13)	Monkey	Same urine as used in Experiment (2)	Intra-peritoneally	10 c.c.	Not so marked	Similar illness on seventh day; recovered	—
(14)	Monkey	Urine concentrated by ultra-filtration from two acute cases; filtered through Berkefeld filter; clear	Intra-peritoneally	5 c.c.	Acutely ill next day; head retraction; extreme prostration	Thought to be dying; eight days later recovered	—
(15)	Rabbit	Urine concentrated by ultra-filtration from two acute cases; filtered through Berkefeld filter; clear	Intravenous	2 c.c.	Toxic effects	Died in convulsions on eighth day	No cause of death found
(16)	Rabbit	Urine concentrated by ultra-filtration from two acute cases; filtered through Berkefeld filter; clear; heated to 55° C. for half an hour	Intravenous	2 c.c.	No toxic effects	Animal remained quite well	—
(17)	Rabbit	Repetition of Experiment (14) except concentrate had stood for some time; phenol added as a preservative	Intravenous	2 c.c.	No toxic effects	Animal remained quite well	—
(18)	Rabbit	Same as Experiment (15) but albumin previously removed	Intravenous	20 c.c.	No ill-effects	Animal remained quite well	—
(19)	Rabbit	Catheter specimen of urine, second day of scarlatinal nephritis; urine sterile	Intravenous	20 c.c.	No ill-effects	Animal remained quite well	
(20)	Rabbit	Catheter specimen of urine from another case of scarlatinal nephritis; fourth day; sterile	Intravenous	20 c.c.	No ill-effects	Animal remained quite well	—
(21)	Rabbit	Same urine as Experiment (20), previously heated to 55° C. for half an hour	Intravenous	20 c.c.	No ill-effects	Animal remained quite well	—
(22)	Rabbit	Urine from severe case of scarlatinal nephritis; second day; sterile	Intravenous	10 c.c.	No ill-effects	Animal remained quite well	—

---

[1] These experiments were kindly performed by Lieutenant-Colonel M. H. Gordon, R.A.M.C., to whom I would express my thanks.

we hear statements to the effect that many of the patients may have had previous kidney changes as the result of scarlatina or other diseases, and particularly in alcoholics, and an acute attack has been brought on by exposure and "chill." Suffice it to say that very few cases of this nature have come under my notice, and these cases have been excluded from this paper, so that not a single case recorded here has ever had a history of any previous attack of nephritis, and no history of scarlet fever. There seems to be little doubt that the acute nephritis is brought on by exposure to cold, but that some infective agent is responsible for the kidneys being attacked. The results recorded above of an investigation of scarlatinal nephritis are of interest in this connexion, especially as the two forms of nephritis bear a close resemblance to one another. I would not, however, wish to imply that I regard the outbreaks in France as scarlatinal in origin, but simply bring forward this evidence to support the theory of an infective origin of the disease. The animal experiments, though certainly inconclusive, point the way to a possible origin of the disease in a filtrable virus or toxin, and much further work is required before this view can be definitely established. We know that the ultramicroscopic organisms are capable of passing through filters, and are easily destroyed at a temperature of 55° C., whereas most toxic substances remain unaffected. In the animal experiments recorded in this paper such results have been obtained in acute cases, but the observations are too few in number to warrant any definite statement. It is hoped that future work upon these lines may establish the point of entrance of such a virus or toxin, and also its influence upon the kidney. Presumably the kidney may hold back such organisms, and filtered extracts of kidneys from cases dying of this disease will be used if possible.

The variability in the duration of the disease and the tendency to remission and relapse are common features, and this is explained by the varying degree of renal damage met with. The low diastase content of the urine appears to provide evidence of extensive renal damage, which accounts for the long duration of the acute stage and the persistence of symptoms. This low diastase content sometimes persists after the albuminuria has ceased, and such patients were found to be subject to frequent relapses. Patients with a low diastase value in the early stages showed a rise to normal as they improved. The slight cases, on the other hand, showed normal values from the first, and these rapidly recovered. The test therefore appears to have a definite value in prognosis, and this is a matter of importance in an epidemic of this nature. The ultimate prognosis of most of the cases is favourable, but a number are subject to remission and relapse, necessitating a long stay in hospital. Again, several patients who have been discharged from hospital as cured return again directly the climatic conditions become unfavourable. This liability to relapse must be still more prevalent when such patients are on active service. The above observations on the diastatic activity of the urine should apply to all such cases, and, since the tests can be so easily carried out, they are recommended for that purpose.

The evidence adduced in this paper therefore suggests that an infective agent is the cause of the disease, and this possibly acts on the kidneys of patients who are susceptible. As a predisposing cause for the entrance of such an infection, cold and exposure no doubt play a prominent part. The frequency with which the nephritis occurred in March and April and the later months of the year 1915, combined with almost identical data obtained from the records of the epidemic of acute nephritis in the American Civil War, the degree of affection of the glomeruli, the chemical tests, and post-mortem evidence, also point to such an origin. The severe and sometimes intractable hæmaturia that occurs in this disease, together with the other characteristic symptoms, such as shortness of breath at the beginning of the attack, are also in favour of this cause. The future only will decide as to the exact nature of the infective agent and its site of entry into the body.

Conclusions.

(1) The chemical changes in the urine, both as regards the diastatic activity and the nature of the proteins present, point to the condition being a true acute nephritis.

(2) The estimation of the diastatic activity may be employed to differentiate the severity of the disease, and also for prognosis.

(3) The low diastase values met with in the severe cases correspond with retention of non-protein nitrogen in the blood and cerebrospinal fluid.

(4) The possible origin of the disease as a result of intestinal toxæmia or of mineral poisoning is excluded.

(5) There is no evidence of a direct bacterial infection either in the blood or urine.

(6) The urine of cases of acute nephritis possesses an increased toxic action upon animals, but the exact nature of this action has not been determined.

(7) Although the disease has not been transmitted to animals, the experiments demonstrate that a definite illness can be induced in rabbits and monkeys, commencing eight days after the injection of urine from acute cases, and in some with a fatal termination on the tenth day.

(8) The experiments afford evidence that there is an ultra-microscopic organism or toxin present in the urine of early cases which appears to be responsible for the ill-effects following injection of the urine into animals.

(9) The investigation of scarlatinal nephritis brings out many points of interest, and simply serves to demonstrate that we are dealing with a true general inflammation in the kidney in both diseases.

Captain R. G. ABERCROMBIE, R.A.M.C.(T.F.).

I wish in the first place to express my thanks to the Society for the opportunity which has been extended to me of being present at this very valuable and informative discussion, on a subject which gives rise to a considerable amount of anxiety to those of us who are working on the other side of the Channel.

The number of cases of this condition is considerable, and I have had under my personal care during some months over 500 patients in the acute phase of the disease. For a portion of these cases I had the advantage of study in association with Sir John Rose Bradford. I must not detain the Society at this hour by a full account of the disease, nor, indeed, is that necessary after the very lucid descriptions which have been already given; but I may be allowed to touch on one or two points, more particularly with regard to the acute stage of the condition.

The early stages of the disease present characteristics of acute nephritis of moderate grade; there are fever, œdema, albuminuria, casts, hæmorrhagic urine, and these leave no doubt whatever as to the nature of the malady.

With regard to the symptoms—and these are remarkably constant—they are headache and dyspnœa. Dyspnœa has already been mentioned, and it is almost invariably present in the early stages of the disease, and not infrequently in the later stages. Many explanations have been given of it. I will mention an observation, which I put forward for what it is worth—namely, that in the acute phase of this form of nephritis the blood-pressure presents remarkable diurnal variations, the morning blood-pressure being lower than the evening reading. The variation extends over 30, 40, 50, or even 60 mm. of mercury, so that though the morning pressure may be but slightly raised, the evening pressure may be very high; these attacks of dyspnœa are almost always nocturnal. Hitherto, these bouts of dyspnœa in nephritis have been, I think, associated with the presence of acidosis, but I now understand from Captain Langdon Brown that that is excluded in cases of dyspnœa. Therefore I submit the suggestion that these very characteristic attacks of dyspnœa may be due to the rapid rise in the blood-pressure which occurs towards the evenings.

With regard to the preceding fever conditions, the disease, when seen early, is often febrile; the temperature is frequently about 101° F. for one or two days. Definite premonitory symptoms are not invariably present, but they are so in about half the cases. The bronchitic are the most common forms; febrile symptoms come second in order, and the third most frequent are abdominal pain and vomiting. Personally I regard these symptoms as part of the disease itself; I dissent from the view expressed by some that the nephritis is a sequel of them.

With regard to tonsillitis, my experience is in accord with the observation of Sir John Rose Bradford, that tonsillitis is rare. I have examined the throats of several hundreds of patients, and tonsillitis has rarely been present. These patients complain of pain and swelling in the throat, but I regard this as due not to tonsillitis, but to laryngitis or to inflammation of the trachea, which is very frequently associated with bronchitis. Tonsillitis is a very unusual association.

Convulsions occurred in fourteen of my cases, and for their treatment I found lumbar puncture valuable, also venesection, especially if associated with saline transfusion. In four of the cases, mania occurred in association with convulsions. In one case, convulsions, stupor and mania followed each other for forty hours, but ultimately the patient recovered.

Changes in the fundus oculi are exceedingly rare, if indeed they occur at all in the early phase.

In the first few weeks of the disease two complications are of great interest, and are valuable as pointing to the nature of the disease. They are herpes and parotitis. Herpes occurs not as a common complication, but as a steady one; perhaps one in every thirty cases exhibits labial herpes. Parotitis, bilateral, indolent in type, non-suppurative, occurred in four cases, and I think those two complications support the view that the disease under discussion is of infective rather than of toxic origin.

I should like to mention a series of cases which forms a definite clinical group, which I call "lower tract cases." These present symptoms of inflammation of the urinary tract, from the pelvis of the kidney downwards. Five per cent. of the cases I have seen come into this group. These patients passed very much more blood than did the others, and they complained of pain in the back and the renal region, often localized to one side; they have more fever, which often persists for a week or ten days. Their symptoms suggest pyelitis, less frequently cystitis, and still less frequently prostatitis. These cases also show a great tendency to relapse. The blood-pressure is not raised, but is low; œdema does not occur in them. The urine presents very large numbers of degenerating leucocytes, but—what is rather puzzling—it often contains granular casts, which makes the nature of these cases somewhat ambiguous. I used to regard these cases as different from the true nephritic cases, but now I regard them as different manifestations of the same pathological process, because the cases occur at the same time as the true nephritic cases, and, broadly, they come from the same areas. Indeed, one group seems to pass into another.

With regard to prognosis, it is good in the acute phase. Out of 500 cases, four terminated fatally and three showed undoubted evidence of preceding disease. One case which terminated fatally about the end of the first week was of considerable interest. It was that of a boy who had been taken ill during a period of severe fighting, and had had great hardships before he was brought into hospital. He died of convulsions shortly after being admitted into hospital. His kidneys did not show great macroscopic changes; they were congested. One kidney was examined microscopically by Captain Henry, who found that the lesion present was essentially a tubular one. By searching, a few glomerular changes were found, but they were inconsiderable; it was a desquamative tubular nephritis, without interstitial change; there was no evidence in the kidney of precedent renal disease. The spleen was very markedly enlarged; the trachea was inflamed and presented a granular appearance. Purulent bronchitis was present. An anaerobe was cultivated from the spleen, but it was probably a post-mortem contamination.

With regard to causation, on which we are in the dark at present, the cases came from scattered places, both from the actual Front and behind the trenches; and occasionally, though rarely, from the Base. They occurred both in cold and hot weather. They came chiefly from the trenches, but the majority of the Army are inhabitants of the trenches. The cases occur definitely in small epidemics, four or five cases in a battalion, and certain areas seem specially prone to the disease. It has seemed to me that a large proportion of the cases came from the Great Salient. Officers are almost exempt.

With regard to the question of toxic as opposed to infective nephritis, I will only say that my view that it is infective is chiefly based on the clinical aspects of the condition, for the symptoms of furred tongue, pain in the limbs, headache, and rise of temperature present the picture of an acute infection. Moreover, when the cases relapse they get a temperature, and all the symptoms closely resemble those of an acute infection. There is also the mode in which the epidemic started; the slow gradual rise and spread of the epidemic are strongly in favour of the multiplication and spread of some causal organism.

I should now like to trespass outside my strict province to speak of the fate of the patients after they arrive in England. It has been my practice to desire every soldier to write to the Sister in charge of the ward, so that I may be able to follow the after-history of the cases. The majority of them seem to do well, but many of them do not. I have been struck by the importance of warmth in the treatment of the cases, and, of course, during transit. In England, as a rule, the patients are well looked after, taking hospitals and railway stations as a whole. And doubtless there are difficulties when large numbers of patients suddenly arrive at a station, with, perhaps, only a small number of ambulances to handle them. But there are exceptions, and I have been struck by the large number of severe relapses which seem to have followed exposure in transit at railway stations in cold weather, where men have been kept waiting for an hour or two, sometimes several hours, in cold weather, with only pyjamas and one blanket to cover them. These cases are altogether exceptional, but I know I am here addressing those who possess great influence, and my hope is that that influence may be used to secure that the soldiers who have endured so much in the trenches shall be looked after in this respect.

Captain LANGDON BROWN, R.A.M.C.(T.F.) (in reply).

One thing, at any rate, seems to have emerged from this discussion upon which we are agreed — namely, that this epidemic is almost certainly due to an infection. The idea of exposure as the cause of an epidemic such as we have had in this War, and in the American Civil

War, has at last, I hope, received its quietus; and it seems to me, from the consensus of views which we have heard, that that is so. If it is a new infection we hope that some of the steps which have been suggested may be taken to find out what is the nature of that infection.

With regard to Sir William Osler's remark that cases which last longer than twelve weeks pass into a chronic condition, I may say that I have had cases recover after having lasted considerably longer than that. I heard only to-day that a man who was admitted under my care in May, and had gone on passing blood and albumin ever since that date, has at last cleared up and become free from both. Apparently, therefore, after many months' duration recovery can occur. I agree that there will certainly be a certain number of residual cases of chronic nephritis, but I think we, who see cases in English hospitals, are liable to form too gloomy a prognosis, because naturally we get the cases here which have not cleared up quickly in France, and which consequently had to be sent home.

Though it had not occurred to me before, I agree with Captain Abercrombie that there is a group of cases starting as a "lower tract pyelitis," which go on to pyelo-nephritis; and that such cases occur probably explains why certain people regard trench nephritis as a pyelo-nephritis.

I thank you all very much for your attention to my paper.

Medical Section.

President—Dr. A. E. GARROD.

(*November* 9, 1915.)

DISCUSSION ON PARATYPHOID FEVER.

Opened by Sir BERTRAND DAWSON, K.C.V.O., M.D.

THIS contribution is chiefly based on the work at the Fourteenth Stationary Hospital, where there are advantages not always available.

Looked at broadly, paratyphoid is typhoid fever in miniature. A patient invaded by it stands to be ill less severely and for a shorter time, is less prone to complications, and, a fortiori, less likely to die. It presents a clinical picture which is suggestive, though not absolutely distinctive, and its certain diagnosis from typhoid can only be made with the aid of bacteriological findings.

Though habitually milder, paratyphoid may present the gravity of severe typhoid. The occurrence of such severe cases suggests that, under conditions favouring it, the disease might break out in severe epidemic form—a consideration which bears upon the question of preventive inoculation.

Investigation would seem now to have established that a mixed preventive vaccine may be used without risk of impairing its effectiveness against typhoid.

The existence of this disease in France is due to "carriers." With men congregated in trenches and billets, it is easy to see how the excreta of a carrier can contaminate food through the agency of man or insect. Strong evidence that the disease is thus conveyed is afforded by a study of the cases of paratyphoid A at the Fourteenth Stationary Hospital. Before this War this disease did not exist in France or England, but was rife in India. The majority of the cases which have occurred in

France are in soldiers who have either come from India or been in contact with those who have.

From the point of view of communicability, the frequent mildness of paratyphoid is one of its serious aspects. Whereas the typical case of moderate severity will afford clinical evidence that the patient is suffering from an enteric group infection, the mild case with ten to fourteen days of pyrexia may, even under the favourable conditions for observation of a hospital ward, disclose no features which are distinctive from those of other mild infections. There will often, however, even here be enough to arouse suspicion and lead to the patient being watched pending bacteriological investigation.

The Typical Case.—(*a*) The onset is more frequently gradual, the fourth being the average day for the patient to report sick. Increasing lassitude, chilliness, a sense of illness, headache with or without pains elsewhere, are the early symptoms. Abdominal pain occurs in about 40 per cent. of the cases. It is generalized, seldom severe, eased by warm applications, and passes after a few days. Pains other than the foregoing are referred to the back and legs and are met with in about a quarter of the cases. Diarrhœa, though it seldom persists, is an early feature of half the cases. Epistaxis, though evidence of value, is not of frequent occurrence. Cough may be present, but it is associated with scanty or no physical signs.

(*b*) The onset is sometimes rapid, which means that the patient is compelled to declare sick within twenty-four hours. Here pains of the head and body, with chilliness, shivering, and diarrhœa, come on quickly and the patient becomes rapidly prostrate.

Vomiting, too, may be a feature of this type of invasion, and then the clinical picture may closely resemble that of food poisoning and of abdominal influenza, or some other variety of gastro-enteritic infection.

The patient does not bear in his face the appearance of illness we are accustomed to associate with enteric fever. He may be dull in expression and slow of speech, but his mind is clear.

Fever.—The fever is lower, remits at an earlier stage and has a shorter duration than in typhoid. Its higher limit is 102° F. to 103° F. By the tenth or twelfth day, or even earlier, it will commonly commence to remit say 2°, and in a smaller proportion of cases to intermit. Towards, or by the end of, the third week the temperature will have reached normal, and the condition of the patient will have improved ahead of the temperature.

Pulse.—The pulse-rate is a sign of real value, its slowness in relation to the temperature being a characteristic of the disease. It may be said, Given headache, fever, and a pulse under 90 to 95, think of enteric. Of the cases of paratyphoid B, 80 per cent. had a pulse averaging under 90,[1] and it is a common occurrence for the pulse to be below 80. The pulse-rate is also a most valuable indication of the severity of the illness. If the rate is below 100, even if untoward symptoms are present, one can feel reassured. *Per contra*, a mounting pulse spells anxiety (Chart I).

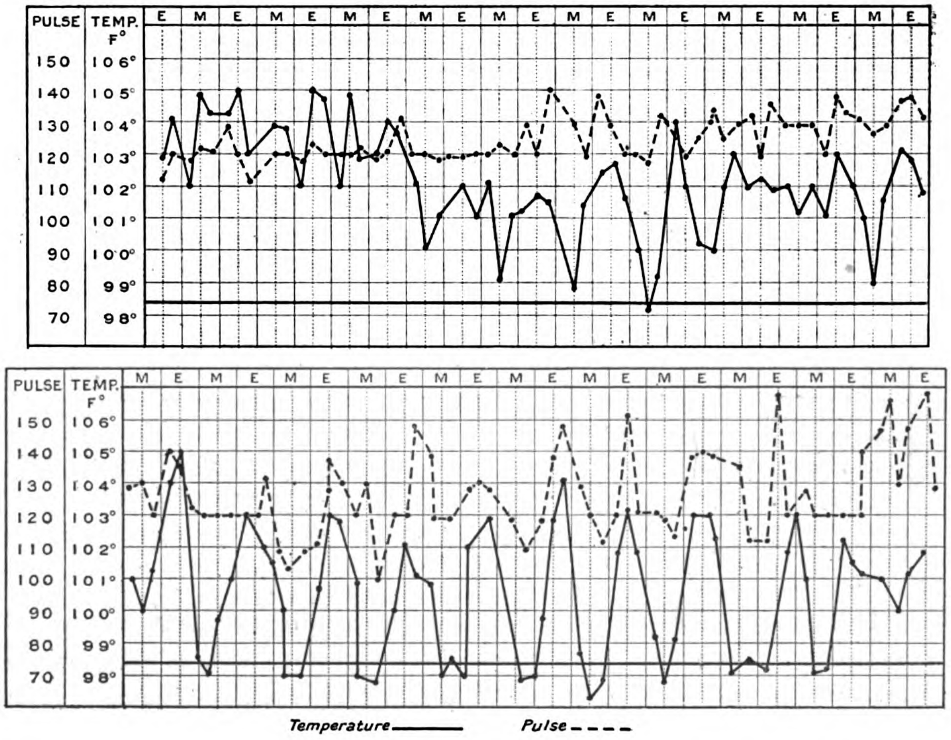


CHART I.

This relationship of pulse and temperature is well shown by charting the two together. In the typical case of paratyphoid the pulse record is well below the temperature (Chart II). When the two lines intermingle, things are less favourable, and when the pulse record rises above that of the temperature the prospect becomes correspondingly anxious. This relationship holds good as long as the temperature is above 100° F.

For this and some other figures I am indebted to an analysis by Lieutenant Whittington.

Below this point tachycardia associated with convalescence may supervene. The softness of the pulse is as characteristic as its slowness, and when in addition dicrotism is present, as in a few cases it is, the picture becomes still more suggestive. The heart impulse is sometimes difficult to feel and a cardiogram difficult to obtain.

The tongue often has a worse appearance than the patient. Its dorsum is dry and furred in contrast with the red tip and edges. The tip may also be smooth and glazed.

The abdomen is seldom distended, but has an elastic feel which is characteristic, except in the mildest cases. It may be a little tender during the earlier stage of the illness, and more often in the splenic region than elsewhere. Gurgling in the right iliac fossa is not noticed—and for that matter it is rare in typhoid.

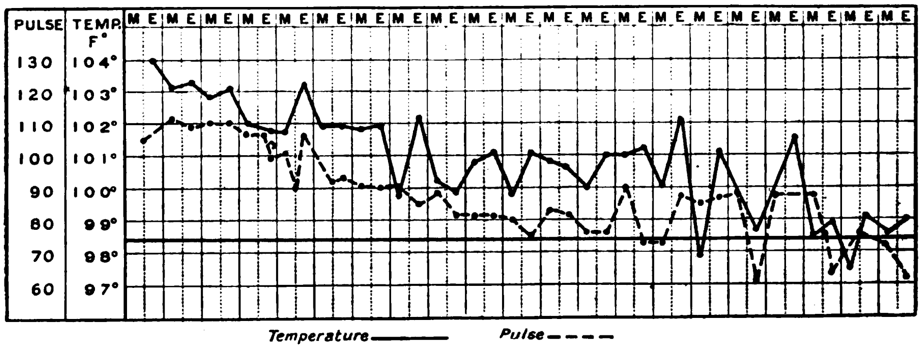


Chart II.

The bowels, though often loose at the commencement, are usually constipated after the first week. The result is that the typical "typhoid" stool is not often forthcoming. This is also true of typhoid, which in recent years in London has been characterized by constipation more often than by diarrhœa—a change from its former habit, judging by past records.

The spleen is enlarged to percussion in over half of the cases, and less often to palpation.

Spots are seen after the first week, and occur in crops, which may continue to appear after the temperature has fallen. Sometimes they are larger and their edges even less marked than the spots of typhoid. They occur sometimes during the illness in the majority of cases. A profuse rash is now and again seen, and, judging by the experience of this hospital, more often in paratyphoid A than in paratyphoid B.

Towards the end of the third week the fever has passed and recovery is usually steady and uneventful. Reinfections are uncommon. In convalescence the pulse-rate is sometimes raised out of proportion to the temperature.

Tachycardia following the subsidence of the fever occurs in a few cases, is very persistent and delays recovery. There would seem to be varieties of the condition: a type which disappears in sleep, and perhaps is of nervous origin; another which persists in sleep and is suggestive of myocardial intoxication; and yet another which seems to be dependent on vaso-dilatation of the splanchnic area. On the other hand, there are cases of bradycardia, which appears to have its origin in the heart muscle and is of favourable import. These and other cardiac irregularities are being studied by Captain Marris.

The severe type of paratyphoid so closely resembles true typhoid as to make description of it here unnecessary.

Post-mortem Appearances. — There were fourteen post-mortem examinations of cases of paratyphoid B infection and of one case of the paratyphoid A group. In the latter there was diffuse ulceration of Peyer's patches, together with slight ulceration of the solitary follicles of the large intestine, and an ulcer in the proximal third of the appendix had perforated, causing general peritonitis. Clinically the case closely resembled true typhoid, death occurring from peritonitis on the twenty-fifth day.

The following were the chief features in the examination of fourteen cases of paratyphoid B infections:—

With regard to the lesions in the bowel, in two cases there was no ulceration present, the lesions being in the spleen in one case and in the appendix and liver in the other; in one case the ulceration was confined to the large bowel.

In the remaining eleven cases the small intestine was ulcerated to a varying extent, the last 2 ft. of the ileum, and especially the neighbourhood of the ileocæcal valve, being the seat of the disease.

In the high proportion of ten cases out of fourteen of paratyphoid B the large bowel was involved, the ulceration being most marked in the cæcum and colon as far as the splenic flexure, and sometimes extending to the pelvic colon.

Judging by this small number of cases, it would seem as if the disease fell more forcibly on the large intestine than in true typhoid.

In two cases of paratyphoid B the appendix was the seat of mischief; in one it was gangrenous and caused general peritonitis, and in the other there was an abscess round it, with secondary abscesses in the liver and right lung, from all of which *Bacillus paratyphosus* B was obtained.

The spleen was enlarged in eight cases. In two instances it contained abscesses, which in one case were the only obvious lesion. From the pus *Bacillus paratyphosus* B was isolated. On one occasion a gangrenous broncho-pneumonia was discovered, and the destructive process had so far advanced as to produce definite abscess cavities from which the paratyphoid B bacillus was obtained.

The foregoing description points to a tendency to pus formation in paratyphoid, but whether more so than in typhoid it is too soon to be certain.

The causes of death were: Perforation, three cases; peritonitis from infected appendix, two cases; hæmorrhage, two cases; hæmorrhage and toxæmia, three cases; toxæmia, four cases; pneumonia, two cases; and splenic abscess, one case.

The mortality was rather over 4 per cent. for paratyphoid B and under 1 per cent. for paratyphoid A.

Complications.—Apart from perforation, hæmorrhage, broncho-pneumonia, and the abscesses and other conditions set forth in the foregoing paragraph, complications are infrequent, and especially in the typical cases. Thrombosis of the femoral veins occurs; also pleurisy, empyema, parotitis, orchitis and cholangitis, &c., in few or isolated instances.

Jaundice.—That typhoid can manifest itself as an acute cholecystitis with jaundice has long been known. With paratyphoid the fever may be slight and the patient present the appearances of a catarrhal jaundice. There were lately two patients in adjacent beds, both jaundiced, both with only slight fever, neither of them looking ill. One was paratyphoid A and the other jaundice associated with gastro-enteric catarrh. This possibility of paratyphoid lurking behind an apparent catarrhal jaundice needs to be borne in mind.

With Professor Dreyer to follow me I will not venture for more than a moment into the domain of bacteriology. Experience shows how greatly the value of the agglutination test has been enhanced by the use of Professor Dreyer's technique, whereby accurate quantitative records can be obtained. If the agglutination test for paratyphoid is positive, the conclusion may be accepted with considerable confidence. The importance of this in paratyphoid is great, for either because the bacilli leave the blood early, or because many cases have mild symptoms and do not come under notice early enough, blood cultures are often negative. Stool cultures, too, only give positive results in a proportion of proved cases, and moreover they take time and only afford aid when the illness is advancing.

With many of the milder cases of paratyphoid, a diagnosis from clinical evidence alone is impossible. With the more severe cases a diagnosis of enteric group can doubtless be made from the clinical data, but no conclusion can be drawn as to which member of the group without resort to laboratory methods.

A negative agglutination test has not the same value as a positive. There are patients who do not give agglutination reactions till late in an attack, or in rare instances perhaps not at all. There have been a few patients reported negative by the laboratory who, after an interval of time, have reawakened suspicions from their clinical behaviour, and on further investigation have been found to be positive. This only leads one to say that a positive diagnosis on clinical grounds should not be abandoned too lightly.

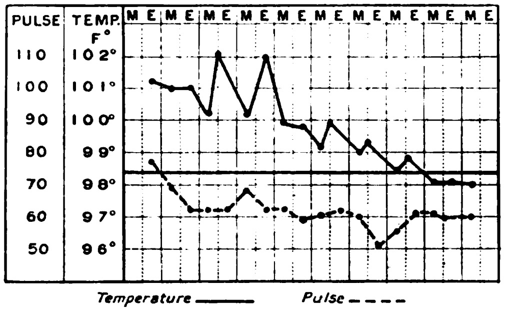


Chart III.

Mild Paratyphoid.—The mild case shows the same variation in onset and the same features as the typical case, but these features are less defined and more transient and thus constitute a less clear picture. The fever lasts for ten to fourteen days from the onset; it may be high at first, 102° F. or even 103° F., but soon falls to about 100° F. (Chart III). The difficulty in diagnosis which these milder cases involve is shown by the fact that not less than 30 per cent. of the cases admitted to the Stationary Hospital as suspected enterics have, after repeated investigations, been reported as negative. These " wash outs " have been classified under such headings as influenza, trench fever, gastro-enteritis, colitis, appendicitis, jaundice, pyorrhœa, rheumatism, malaria, tubercle. Some of such cases may only require the opportunity for clinical observation which a base hospital affords for a correct diagnosis to be arrived at, but there are others which resemble paratyphoid more closely and need further consideration.

(1) *Trench fever* has a quick onset, is characterized by chilliness, prostration, and pains in the muscular and fibrous tissues, mostly noticeable in the back and legs. Headache is also present, and at the commencement there may be nausea and vomiting. At first this condition could easily bear a close resemblance to that form of paratyphoid which commences suddenly and in which body pains are prominent features. As the illness progresses the similarity diminishes, for in trench fever relapses are common at intervals, it may be, of three, four, or even up to ten days.

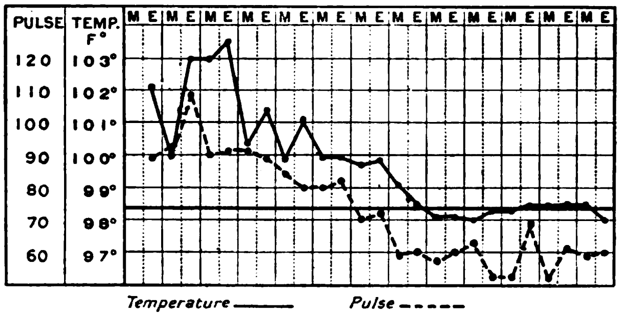


CHART IV.

(2) *Infective Gastro-enteritis.* — This is a condition which may mimic atypical paratyphoid closely. The onset is gradual; for two or three days there is an increasing lassitude with aching of head and limbs. By the third or fourth day the patient is compelled to lie up, the pains are worse, there are often one or two attacks of vomiting; discomfort and even pain in the abdomen are frequent, especially in the upper half, and constipation is the rule. The tongue is dirty—a yellowish fur on the dorsum and no contrasting red edges and tip. The temperature record is shown in Chart IV. The pulse is slow, jaundice is sometimes a feature, blood cultures and agglutination are negative, and some of the cases have leucocytosis.

Influenza.—Here the difficulty only lies with the case which begins abruptly, for influenza never comes on slowly. Between paratyphoid and gastric influenza the similarity can be close. In both there are pains, nausea, vomiting and diarrhœa, and in both the pulse is slow.

The similarity gets less as the illness proceeds, and the appearance of an enlarged spleen, spots, or positive bacteriological findings would put an end to doubt. Moreover, it is doubtful if gastric influenza is so common a disease as is imagined ; it occurs for the most part in epidemic form, and sporadic cases should be looked upon with mistrust. A warning is needed against the ever-widening significance that is being given to the term "influenza." I submit that the majority of cases of true influenza are characterized by an inflammation of the air-passages, and that though other forms do occur they are not usual, and in their diagnosis a healthy scepticism should be observed.

It would seem probable that paratyphoid is of more common occurrence in civil life than has hitherto been imagined, and that it accounts for a proportion of undiagnosed fevers. The moral is that blood examination needs to be a more routine practice.

Professor GEORGES DREYER, M.D.

I feel that it is a very difficult task for me to attempt to follow the distinguished opening speech of Sir Bertrand Dawson, especially as I have not had leisure at my disposal to prepare any written statement of what I wish to say. I hope, therefore, that you will excuse me if some of my remarks appear to lack that coherency which I would wish them to possess.

The subject with which I am dealing is one of very great importance at the present time. The problem of the bacteriology of typhoid and of paratyphoid fevers can conveniently be set out under three main headings: (1) the bacteriology of the active disease; (2) the bacteriology of carriers; (3) prophylaxis, not the least important—indeed, one might almost say the most important of all. Diagnosis and prophylaxis will constitute the main theme of my remarks this evening, though the importance of carriers must not be overlooked, and is a matter of extreme urgency from the practical standpoint.

The bacteriological diagnosis of typhoid and paratyphoid infection may most naturally be dealt with as follows: First, the recovery of the microbe from either the blood, the stools, the urine, or other secretion; second, the immunity reactions. And here, by far the most important reaction, from the point of view of diagnosis, is the agglutination reaction. I have some figures here which will show you, roughly, the importance of these various methods of diagnosis.

It must be remembered that if one has to diagnose typhoid or paratyphoid fever, one has to deal with cases which sometimes reach us at an early stage in their disease, sometimes—and this more frequently—a week from the commencement, while some are seen only in the convalescent stage. In regard to blood cultures, if the case should be a late one the chance of obtaining a positive blood culture is greatly diminished, because bacillæmia, especially in paratyphoid fever (and more especially in paratyphoid A), is frequently of very short duration. On the other hand, you will find, if you examine the stools for the bacteria, that in the case of typhoid the bacteria disappear from the stools comparatively soon, and that you have to hunt for them time after time, and need to examine not one specimen but many; and it is only in a relatively small number of cases that a positive result is obtained. In the case of paratyphoid B we are in a much better situation; it is possible to recover that organism from the stools with much greater frequency than in the case of paratyphoid A or typhoid itself. To show the relative success of these methods of examination—blood culture, recovery of bacteria from the stools and from the urine—as compared with the results obtained by agglutination tests, I am in a position to make the following statement, based on the examination at different times of a large number of cases of enteric fever (typhoid, paratyphoid A, and paratyphoid B), namely, that in about 30 per cent. of cases in which the microbe was actually recovered, it was possible to isolate it from the blood, whether the case happened to be paratyphoid A, paratyphoid B, or typhoid. From the stools it was possible to recover the bacterium in about 20 per cent. of the cases of typhoid and paratyphoid A. On the other hand, it was possible to recover the bacterium from the stools in paratyphoid B in between 70 per cent. and 80 per cent. of the cases. This does not mean that one is necessarily successful at the first examination. Frequently several examinations were required before a positive result was obtained. On the other hand, in *every* case bacteriologically proved to be a typhoid or a paratyphoid B infection, the agglutination method gave a positive diagnosis (i.e., 100 per cent. of the cases), while in the case of paratyphoid A infection the agglutination test failed in only about 7 per cent. of the cases. Why are the results with paratyphoid A relatively so poor? The reason is that for a considerable time I did not know how low is the agglutination given by paratyphoid A in certain cases. One had always taken 1 in 25 as the limit below which no positive diagnosis should be made. But in the case of paratyphoid A that is wrong. If one uses standard cultures and follows the technique laid down for their employment, I am now convinced that an agglutination of 1 in 10 is, for all practical purposes, diagnostic in cases of paratyphoid A. In the case of paratyphoid B it does not matter; you practically always have a high agglutination. But even with an agglutination of 1 in 10 I should be extremely suspicious; and, as a matter of fact, unless the patient had had paratyphoid fever in the past, an agglutination of 1 in 10 may be taken as positive. The so-called co-agglutination, which people have written and argued and fought about so much, does not really cause any practical difficulty. It is so very rare with standard cultures. You may find a serum agglutinating *Bacillus typhosus* 1 in 500, 1 in 10,000, or even 1 in 200,000, and it will not agglutinate paratyphoid A or B as much as 1 in 10. On the other hand, you have cases where there is an agglutination of *Bacillus typhosus* of 1 in 500, and you also have an agglutination in paratyphoid B of 1 in 50; and the next time you examine you have an agglutination of paratyphoid B 1 in 30, and the next time 1 in 20. When that happens you know that the case is one of mixed infection. Under war conditions especially one has to keep constantly in mind the possibility of mixed infections. Such an infection may be a simultaneous infection with two microbes (e.g., paratyphoid A and B or *Bacillus typhosus* with paratyphoid A or B); or one infection may succeed the other—a case of typhoid, for example, becoming later on infected with paratyphoid, or vice versa.

There is a further point with which I must deal here, that is, the question of the difficulties that may present themselves in making a diagnosis by means of agglutination tests in inoculated persons. It has been stated that in the case of persons inoculated against typhoid, the agglutination test cannot be used in diagnosis. But this is by no means the case. The determination by a single observation of the absolute strength of a serum in any particular immune substance is of little aid in diagnosis. For instance, a person may several years ago have had enteric, and he may still show a high agglutination figure. But if successive examinations show a marked fall or a rise, this is conclusive evidence that the man has active disease. In the case of febrile conditions other than enteric, a slight rise, followed by a fall, may be observed if the person has been inoculated; but these slight excursions have not hitherto been found to interfere with the diagnosis of active enteric. Therefore a rise from, e.g., 10 to 25 or 50 is much more important than the presence at a single observation of a high titre of 1,000 or more. For instance, if the agglutination on three separate occasions, at intervals of four days, is 1,000, that person is not suffering from active enteric; he has either been inoculated or he has suffered from the disease some time ago. On the other hand, if there is found either a marked relative rise or fall in the agglutination titre, whether it be high or low, there can be little doubt that we are dealing with an active case. A rise indicates the beginning, a fall the later stages of the disease. A further point of interest is, at what stage of the disease will the agglutination reach its maximum? If you take a large number of cases, you will find that the twentieth day is commonly the day on which the maximum agglutination has been reached. In the case of typhoid or paratyphoid B infections a fairly high agglutination titre is usually produced early in the disease; but the case is different with paratyphoid A infections, for in these the titre in the initial stages is often very low, and may easily lead to a negative diagnosis unless the test is carried out with low dilutions of serum—e.g., one-fifth or less. If, however, the patient develop a relapse, the titre will usually be found to rise, and frequently reach as high a point as in cases of typhoid and paratyphoid B.

I will now pass on to the very important question of prophylaxis. There is no doubt, in my mind at any rate, that we have been spared from enteric epidemics greatly or entirely because of the defensive inoculation with typhoid vaccine; for, considering the number of soldiers we have engaged, we can regard the number of cases of the disease in France as of no consequence. And I would like to say also that, in my opinion, the way in which this typhoid inoculation has, for years, been carried out in the British Army, and the way in which the vaccine is prepared, and the regularity of the appearance of agglutinins in the blood serum of inoculated persons, prove how extremely well and carefully the technique has been worked out and carried out.

Although the results of inoculation have been so wonderfully good, we must not lose heart if, under other conditions, the number of cases of typhoid increases considerably. For instance, if a part of our Army were to enter an already heavily infected area, we might find that the protection was not so efficient as it is at the present moment. But we should have one cause for satisfaction, that the disease would almost certainly take a relatively mild course.

Another point which it is important to keep in mind is, that as the War goes on, the percentage of cases of typhoid in inoculated men must necessarily rise. It must increase for the very simple reason that while in the very early stages of the War a fair proportion of the men were not inoculated, now, practically all are inoculated. For this reason later statistics may appear less favourable than the earlier ones, though in reality they are not so.

The second point of importance in this matter of prophylaxis is this: Is it possible safely to produce an effective immunity against the two paratyphoid bacilli without prejudicing the protective value of a typhoid inoculation performed either previously or simultaneously?

The best answer to these questions is to review the experimental and other data which have a direct bearing upon the matter. The first to show that we could protect an animal by a simultaneous inoculation of several microbes was Castellani. He injected a mixture of typhoid, colon bacilli, and what he called the bacillus of pseudo-dysentery into rabbits, and he proved that the rabbits developed simultaneously an immunity towards all three. Still, he did not prove what is to us the most important point, whether it is better to inject these micro-organisms simultaneously or one after the other at given intervals.

There is, however, ample evidence from observations of Jörgensen and others that in successive immunization with micro-organisms of the colon-typhoid group, the immunity evoked against those organisms which are injected later in the series is less than the immunity obtained when they are mixed together and injected simultaneously, unless a considerable interval is allowed to elapse between the inoculations. This result is independent of the order in which the different organisms are employed.

Since we have no reason to believe that man behaves in these respects differently from other animals, you will see that in the case of man it is not only advantageous, but it saves time, to give the inoculations at one time. The next questions are: How much a man can tolerate without a severe reaction, and how many bacteria are necessary to produce a good protection? Castellani has been investigating these problems for a considerable time, and his results, so far as they go, have been very encouraging. He has not until lately given a detailed description of how many microbes he injected, and in my opinion the number he gives is too small. He gives for the first dose 300 million typhoid, 150 million paratyphoid A, and 150 million paratyphoid B, and for the second dose double these quantities. Sometimes he gives a third injection of the same size as the second. But three inoculations are rather a nuisance, not only to the man but also to the medical officer who has to give them.

In England, two years ago, Cummins and Cumming, of the Royal Army Medical Corps, made some very careful observations on the inoculations of paratyphoid A, and found that it produced no greater reaction than the injection of a similar dose of typhoid bacilli. They also injected a mixture of paratyphoid A and typhoid without any ill-effects. Their number of observations, however, was small. Kabeshima, on the other hand, has recorded a long series of results of inoculations with mixed vaccine which are extremely good, as judged by his data. Vincent, Widal, and others have also recently strongly advocated the triple inoculation. In collaboration with Dr. Ainley Walker, Dr. A. G. Gibson, and Dr. A. D. Gardner, I have inoculated during the last six months or more a number of persons with a triple vaccine. The number of bacteria contained in the vaccine used so far has been such that 1 c.c. of vaccine contained 1,000 million typhoid, 500 million paratyphoid A, and 500 million paratyphoid B. We have given two doses with a ten days' interval, the first dose consisting of ½ c.c. (containing 500 million typhoid, and 250 million each of A and B), the second dose being a full cubic centimetre (containing 1,000 million typhoid and 500 million each A and B). So far as our experience goes, these inoculations do not cause any appreciably greater local reaction or malaise than the 500 million and 1,000 million doses of typhoid alone. But, of course, one will always find some individuals hypersensitive to any inoculation. The greatest effect I felt myself from a triple inoculation was some stiffness in my arm; the reaction was less than when I inoculated myself with typhoid alone five months before.

As regards these triple inoculations, I have not yet had time to work out the figures in detail, but I show one table giving shortly the results. These results have been extremely good judging by the agglutination titre obtained, and I should say that the degree of agglutination reached for *Bacillus typhosus* has been as high as that obtained by inoculation with *Bacillus typhosus* alone; and at the same time, we have derived a very marked immunity against the paratyphoids. It is, however, to be seen from the table that the agglutination titre reached for paratyphoid A is on an average much lower than that for *Bacillus typhosus* and *Bacillus paratyphosus* B.

Another point, which is strikingly brought out by the table, is that individuals react in quite different ways to a triple inoculation. One acquires a high titre to typhoid and a low one to both paratyphoids. Another reacts strongly to paratyphoid B and A, and less strongly to typhoid. This suggests an explanation how it is that one individual, even if he lives among typhoid cases, will not become infected, while the same individual, if exposed to paratyphoid infection, will contract the disease. For it is clear that, if individual differences in the reaction to inoculation are so marked, there are likely to be equally pronounced variations in the natural immunity of individuals to different infections.

TABLE TO SHOW THE AGGLUTINATING POWER OF THE BLOOD SERUM OF PERSONS INOCULATED TWICE WITH TRIPLE VACCINE ABOUT THREE WEEKS BEFORE THE DATE OF EXAMINATION.

	Agglutination titre for		
	Bacillus typhosus	*Bacillus paratyphosus* A	*Bacillus paratyphosus* B
(1)	4,000	280	370
(2)	1,200	700	5,300
(3)	1,000	55	75
(4)	900	35	120
(5)	700	550	90
(6)	500	1,100	1,800
(7)	500	70	750
(8)	350	35	300
(9)	200	25	120
(10)	70	55	2,220
(11)	40	70	900
(12)	15	16	750

The figures represent the highest dilution in which agglutination occurred.

I have only time to deal very shortly with the important question of carriers. The search for carriers is one of the most important measures in preventing the spread of typhoid and paratyphoid infections. The usual procedure is to examine fæces and urine by means of direct plating on one of the well-known selective culture media. Besides this, the brilliant-green method, described by Carl Browning and his co-workers, seems to constitute a distinct improvement on other methods, more particularly in the case of paratyphoid B. Some months ago I proposed the use of the actinic rays from an electric arc between water-cooled silver electrodes for the isolation of typhoid and paratyphoid bacilli from enteric stools. Experiments with certain laboratory strains of *Bacillus typhosus* and *Bacillus coli* yielded promising results, and one thought it desirable to give others the opportunity to test the method independently. I have now myself sufficient evidence from practical experience in cases of enteric that the results yielded by this method in its present form are in no way better than, if as good as, those obtained with direct plating; and I should say that they are distinctly inferior to the results of Browning's brilliant-green method.

I have taken this opportunity of stating the opinion at which I have arrived so as to spare others who are working with the method the trouble of further unfruitful researches.

Sir WILMOT HERRINGHAM, C.B.

There is really nothing for me to add to what Sir Bertrand Dawson has said, except that the onset of trench fever is often quite sudden. We have had, perhaps, thousands of cases of that condition at the Front, but they do not very often get down to the base. The case depicted on the chart is a very long bout for an ordinary attack of trench fever. I dislike the term "trench" fever because, as far as I know, it has nothing to do with the trenches. It occurs in two classes of people: mainly those who are actually fighting and people in medical units. It has this further peculiarity, that it began about June, and its severity is now tailing off. Sir Bertrand Dawson has, I think, shown conclusively that even when you examine a case very thoroughly indeed, you cannot, in a large number of instances, prove it to be paratyphoid that you are dealing with. And I think that neither he nor anybody else would, under those conditions, say it is even a mild form of paratyphoid. It varies very much, but the prominent point about it, when it is typical, is its brief period of fever, which may last, perhaps, only three days; and it may be succeeded, two days later, by another bout, and the patient may have a third, or even a fourth, relapse. Between the bouts there are periods of normality. Sometimes there is only one bout, but generally there are two. The afebrile intervals vary from a few hours to several days. We have had some cases in which there was an interval as long as ten days with a completely normal temperature, spaced out with bouts of fever lasting two or three days, during which the man felt slightly ill. I have seen that repeated four or five times. Nothing like malarial disease was found in the blood, and by gradations in different cases you could link these up to cases of trench fever which had only a few hours' interval. Clinically, there was no difference in the symptoms of the cases.

And there is another set of cases, of which the chart exhibited shows, perhaps, an instance, in which there is not a relapsing fever, but a "hogsback" chart. That lasts eight or ten days. One of our medical officers was trying to inoculate himself by means of lice, which he thought conveyed trench fever. He got a very bad temperature for ten days of a "hogsback" type. I do not think real trench fever is conveyed by lice; I think it is to be traced to the seasonal incidence of some fly or insect, but we no not know what insect, or the manner in which it conveys the infection.

(Adjourned to November 23.)

Medical Section.

President—Dr. A. E. GARROD.

(*November* 23, 1915.)

DISCUSSION ON PARATYPHOID FEVER.[1]

(Continued.)

Sir WILLIAM LEISHMAN, C.B., F.R.S.

I FEEL at a disadvantage in taking part in a discussion in which I have not heard the principal papers. I am dependent for my knowledge of them on the rather short summaries which have appeared in the medical journals. However, I think I know what are the views of the chief speakers at the last meeting, that is to say, Sir Bertrand Dawson, Sir Wilmot Herringham, and Professor Dreyer. What I have to say about paratyphoid fever will be confined almost entirely to the disease as we have met with it in France. Though my remarks may appear to be somewhat disconnected, it is a very long story, and I can only pick out one or two points in connexion with which I may be able to tell you some interesting things.

First of all, with regard to the prevalence of paratyphoid fever in France among the British Expeditionary Force and its progress. We have been fortunate in having had very little of this disease. Up to a few days ago, when I left France, there had been only 1,200 cases in fifteen and a half months of war, and the case-mortality has confirmed what we already knew, that it is not a very grave disease as regards danger to life; for, during all this time, we have had only eighteen deaths from paratyphoid fever, a case-mortality of 1·5 per cent. And at the present moment the situation remains very favourable, for the total of typhoid and paratyphoid cases combined, in all our hospitals in France, stands now at a lower figure than it has done since October of last year. The total number of typhoid cases in hospital, you may be interested to hear, is only thirty, the lowest figure recorded during the last twelve months, while the total number of paratyphoid is ninety-two.

---

[1] Adjourned from meeting of November 9, 1915.

With regard to the relative proportion of paratyphoid A and paratyphoid B, I cannot give you precise figures as they have not yet been analysed and checked, so can only tell you roughly that paratyphoid B has been in excess; from two-thirds to three-fourths of the cases have been paratyphoid B, as against one-third to a quarter paratyphoid A. The B form we expected; the A form we hoped we should not encounter. When we met with cases of paratyphoid A, we were inclined to connect them with the arrival of the British troops from India to join the Expeditionary Force; and certainly some of the earlier cases of paratyphoid A occurred among them. But we soon found that the cases were not limited to these troops or to those in contact with them, and it seems to me probable that other cases have either been contracted out there from the civil population, or have been brought from other countries or from home. Certainly it has been by no means confined to the troops which served in India, where, as you know, it is the prevailing type of paratyphoid fever.

As to the method of infection, I see that Sir Bertrand Dawson attributed that chiefly to carriers, and I think probably that is right. We have had nothing, for instance, in the shape of any explosive epidemic which would suggest a large contamination of the water supply.

Let me now tell you a little of our system of dealing with these fevers. When a man reports sick with fever, he comes into the field ambulance. He is not kept there long, however, but is sent back to a casualty clearing station. There a blood culture is made, in nearly every case, by the bacteriologist attached to one of our mobile laboratories who has been telegraphed for, for this purpose. He may or may not succeed in getting a positive culture or definite information from the agglutinins, but often, even at that stage, we can get a definite diagnosis. The man is now sent down the line in an ambulance train, in the special carriage reserved for infectious cases, and is eventually admitted to one of our isolation hospitals, to all of which we have laboratories attached controlled by skilled bacteriologists. As soon as the diagnosis is established, a telegram to this effect is sent to General Headquarters and thence to the A.D.M.S. of the Division, who sees that the medical officer of the unit from which the man came takes the necessary precautions. If other cases should crop up, he is then on the alert for them; and it is the duty of the bacteriologist of the mobile laboratory attached to that portion of the Army to go at once and inquire into any little outbreak of three or four cases, and aid in the search for the cause and for possible carriers. At Headquarters is kept a collection of "spot maps," showing where every case of typhoid or paratyphoid has occurred, unit by unit, so we can put our fingers at once on any unit which shows the occurrence of two or three cases of the same nature in a short time.

A large proportion of the infections which our men have got has undoubtedly been from contact with the native population, or what is left of them, close to the Front, and especially with the Belgian refugees, who at one time swarmed in certain villages. Most admirable work has been done there in the way of house-to-house visitation in these cottages, searching among the people and detecting every case of fever, and removing them to hospitals for treatment. In that way many carriers have been detected among the civil population, and prevented from being a source of further danger to the troops. A large number of typhoid inoculations were also carried out, and this was readily accepted by the inhabitants. A great part of this area round Ypres and Poperinghe, which at one time was very heavily infected, has been cleared, and there are practically no cases occurring there now. The importance of that work is seen when it is remembered that in many of these houses the soldiers were actually billeted; and, in any case, they come into very close contact with these people. I should like to acknowledge the valuable assistance in this work which has been given by a certain voluntary unit — the Red Cross unit belonging to the Society of Friends, which has been working gallantly in the Ypres and Poperinghe districts, under most difficult conditions.

I now come to one or two other points. I noted in Professor Dreyer's remarks that, in his opinion, there are probably a very large number of mild undetected cases of paratyphoid. I am by no means convinced that this is the case. It is certain that a small number of cases may go undetected if they are very mild, but with our system I think that number is insignificant. Professer Dreyer founds his conclusions on detecting, by his special agglutination technique, certain traces of positive agglutination to paratyphoid A and B, which, he thinks, furnish absolutely certain evidence that the patient either has, or has recently had, paratyphoid infection. Personally, I think he goes too far, because of the very low dilutions to which he attaches importance. However, that is a matter for the future. Certainly, Professor Dreyer's delicate and beautiful method of agglutination has some fallacies in it which he did not recognize at first. Some of these he recognizes now; others may be recognized later. Anyhow, certain very necessary control experiments in connexion with these determinations are still lacking, and I hope that, when I get back to France to-morrow, I shall find they have been largely supplied, because some of my colleagues are working to provide these very necessary controls; for example, to see what is the effect of other fevers on the agglutination index to paratyphoid A and paratyphoid B in such low values as 1 in 2, 1 in 5, &c.

There are, of course, a good many cases of transitory fever contracted at the Front, due, no doubt, to a variety of conditions, but I do not think it either fair or scientific, if the cause is not obvious, to assert, without proof, that they must belong to the typhoid group. An instance in point is that interesting condition, trench fever. In this the pathologists of our laboratories near the Front have made a careful and exhaustive series of examinations of the blood and fæces, and if there is one thing certain in these cases, it is that they are neither typhoid nor paratyphoid; they showed no trace of agglutination to paratyphoid A or B, they had no gastro-intestinal symptoms, and the whole clinical picture was different: and yet there were many who at first suggested these were cases of paratyphoid. Trench fever, in my opinion, is a definite disease by itself—a mild disease, but very distinct. It is closer to the tropical disease dengue than anything else I know. Fortunately, it has now stopped, but whether this is owing to mosquitoes being dead or dormant I do not know. I thought at one time it was more likely to be spread by lice.

Then there is the question of the influence of prophylactic vaccines on paratyphoid fever. I had the pleasure, a few nights ago, of listening to a most interesting address by Professor Castellani, whom I am glad to see here to-night, on the subject of mixed vaccines, and after that I gave my own views, and I shall not trouble you by repeating them to-day at length. Professor Castellani knows that I am not altogether satisfied with the evidence which he brought forward that his mixed paratyphoid and typhoid vaccine is a good thing. The dosage which he recommends of this mixed vaccine is, in my opinion, much too small to confer adequate protection, that is to say, a protection which will last more than a month or two. It would, of course, be possible to add more typhoid and paratyphoid than he suggests; and, by means of trial, to find out whether the reaction produced by such increased doses was not too great for practical purposes. The chief concern I have in my mind on this question of a mixed vaccine for typhoid and paratyphoid is that, above all things, we must not tamper with the typhoid element in the vaccine. Typhoid is by far the graver disease, and although we have fortunately had little in France—I may say we have lost only one officer from it during the War, and he was uninoculated—still, it is a grave potential danger, and anything which might damage the immunizing properties of the typhoid element would be, to my mind, a very serious thing. The whole question has recently been under consideration by a Committee, but as their report has not yet been considered by the War Office, I am not at liberty to say anything about its recommendations. I feel very strongly on the point that the typhoid element in the vaccine should not be damaged. I, and the colleagues who have worked with me at the Royal Army Medical College, know well how extraordinarily sensitive vaccines are, and what apparently trivial things may make all the difference in the world as to whether you get satisfactory immunity or not. You will have seen, from the low numbers I have quoted to you, that the paratyphoid we have had in France has not been a very serious affair, so the need for such a vaccine is not very urgent there. Of the Mediterranean Force I can only speak from second-hand information, but as paratyphoid seems to be more prevalent there, there appears more urgent reason for its employment among these troops, in the hope that it may give them a substantial triple immunity.

Fleet-Surgeon P. W. BASSETT-SMITH, R.N.

It is with the permission of Sir Arthur May, Director-General, that I speak on this matter. In the first place, my work and the investigations that have been done have taken place in naval cases which have been admitted into the "Dreadnought" Hospital, Greenwich, and, by the courtesy of the staff there, I have been able to thrash out a certain number. In addition to this, a considerable amount of material has been sent to me from the Royal Naval Hospitals at Portland and elsewhere for investigation. The material which I had to work upon was not very large, but at the present time it is being greatly increased as transports bring the cases home. The great majority of the naval cases which one has been investigating have been derived from the Dardanelles area, so that what one is speaking about is quite different from what Sir William Leishman has been referring to. In most of these cases, unfortunately, the diagnosis has been only very roughly made, the laboratory examinations have been comparatively few, and the cases have been sent in as either dysenterics or as enterics, without any differentiation as to whether they are paratyphoid A or paratyphoid B. I have also received statistics for the whole Navy, which will be published later on, I hope. It may be of interest to point out that since the beginning of the War—that is, from September, 1914—anti-typhoid inoculations were commenced, and were systematically carried out among the men who were likely to form part of the Expeditionary Force, including a number in the Royal Air Service: 21,000 have received the inoculations against typhoid in two doses, and 2,000 a single dose. About June of this year, the recognition of paratyphoid was beginning to be felt at Malta and the Mediterranean, and after that time inoculations against paratyphoid were begun at Malta, Greenwich and Plymouth. The paratyphoid vaccine was made from strains derived from the patients, and they were polyvalent both for A and B. The cases I speak of are those which occurred from June to the end of September, and only those in which there was a fairly complete bacteriological investigation have been included in the statistics. A large number of cases were coming in, and our object was to get them out again as fast as possible, and so relieve the congestion in the hospitals. The investigation consisted in ensuring that the cases were not carriers. But there were a certain number upon which one was able to base conclusions for diagnostic purposes. The regulations are that every case of pyrexia shall have a blood culture made and the diagnosis made from the organisms found. Also that every case shall have the excreta thoroughly examined for typhoid, paratyphoid, and dysentery organisms; and, lastly, that agglutination should be carried out in all cases; and in the cases which are convalescent, the diagnosis must necessarily depend on the agglutination reaction, and suitable treatment must be carried out. Professor Dreyer's method is used, if possible; but it requires rather a lot of blood, and the amount of blood which is sent is not always sufficient for the purpose. I prefer to use measured quantities rather than drops.

Another important point is that I think all these cases which come home labelled "dysentery," should be regarded as potential cases of paratyphoid, because so many of them are found to be that. In one case from the "Dreadnought" Hospital, with typical dysenteric stools, I isolated Shiga's bacillus. The actual figures I cannot give you, but from an examination of the authentic cases—those which were properly investigated—one finds the percentage of cases at Plymouth to be

11 per cent. of true typhoids, 40 per cent. paratyphoid A, 20 per cent. paratyphoid B, while 29 per cent. were indefinite. My results were not quite the same as those. I got 12 per cent. typhoid, 14 per cent. paratyphoid A, 36 per cent. paratyphoid B, and 30 per cent. uncertain. That is to say, cases of paratyphoid A and paratyphoid B seemed to vary considerably. In some cases from the Peninsula the reaction is very indefinite—I mean cases in which the man has been inoculated and the typhoid reaction is very low, and there is no other reaction obtained with the serum. Some of them, probably, are coli infections. An officer came from the Peninsula not long ago who got an attack of mild fever, and in his case it proved to be a coli infection; and probably there are many coli infections in what we thought were enterics.

Another point is, that out of 208 cases reported, there were ten deaths which are attributed to typhoid. I cannot say whether they were typhoid or not, because they died while out there; but of those ten cases, six had never been inoculated, and in the case of one other I think it is very doubtful whether he was or not. Of the paratyphoids who are coming now, I have no record of any having died.

There is a very vexed question. We have recognized in the Navy that the paratyphoid infection is very common; therefore if any immunity can be derived from vaccine treatment, it is well worth while to give it. Therefore we have been using it freely, in moderate doses; we are using more and more every day. But the principle we have always set forth is that of immunizing completely with typhoid vaccine, which should never be given up. At first all cases had their first and second doses of antityphoid inoculation; after that they had paratyphoid vaccine, in either one or two doses. First they had 250 million each of A and B, and in the second dose 500 million of each. If only one dose could be given, the larger dose was given. It is a polyvalent vaccine, and the method has been by growing in broth; the bacilli were killed by heating at 55° C. for half an hour. Recently, however, there has been more urgency in getting men out, and so we have tried to hasten the method. Hence a mixed or triple vaccine has been prepared and has been used in 300 cases of which I have the notes. In these, the first dose consisted of 500 million typhoid, and 250 million each of paratyphoid A and B, and the second dose was 1,000 million typhoid and 500 million each of paratyphoid A and B. The officers I have treated myself, the men I have reports of, and in practically all the cases there has been an absence of complaint, and there was no more trouble than with the ordinary mono-vaccine. We have found it has produced a fair amount of immunity, as judged by agglutinins. I do not believe that agglutinins are a good means of judging, but still it is the method commonly used. First, the immunizing value has been good for cases which have been treated. Secondly, the reaction has not been excessively high. Thirdly, there is a great gain in time if men are wanted quickly. Fourthly, the amount of typhoid vaccine which we are using in the Navy has not been diminished, so I hope we shall not only secure full protection from typhoid, but that we shall get a moderate amount of immunity from other diseases.

Professor CASTELLANI, M.D.

Having had the opportunity of seeing numerous cases of paratyphoid fever in the Tropics, where I have been practising for the last fourteen years, and recently in Serbia, I may, perhaps, be allowed to make a few remarks on the subject. In Ceylon the commonest type of the disease was paratyphoid A, while in Serbia paratyphoid B was much more frequently met with.

As regards the clinical symptoms and course of the malady, one may say, in a general way, that paratyphoid is a milder and shorter disease than is true typhoid. But there are many exceptions. I have seen several cases of paratyphoid A lasting for two, three, and even four months, and I have seen several cases end fatally. In my opinion, paratyphoid cannot be clinically differentiated, at least in the Tropics, from true typhoid, especially as true typhoid in tropical countries very often runs a most atypical course and may begin quite abruptly. The diagnosis of the malady, therefore, is based on bacteriological methods, but of those it would be superfluous, here, to give a description.

As regards treatment, it should be on the same lines, in my experience, as that of true typhoid. I may say at once that in Ceylon I still adhere to the old rule that typhoid and paratyphoid patients must be kept on strict fluid diet during the whole course of the fever, and for some days after the fever has subsided. I know, of course, that the modern tendency, both in America and Europe, is in favour of giving a more substantial diet to typhoid and paratyphoid patients; but in Ceylon and India both diseases often show a malignant type, and the mortality from them has been much higher than in Europe, so it is better to be on the safe side. One of my colleagues in Colombo abandoned the old rule, but he had such disastrous results that he soon returned to the time-honoured practice.

As regards drugs, I can endorse the statement made so many years ago by one of the greatest clinicians of modern times, Sir William Osler, when he said that the fewer drugs given to a typhoid patient, the better for the patient. Urotropine, however, is occasionally useful in preventing complications in the gall-bladder and the urinary bladder.

Of the vaccine treatment, both in typhoid and paratyphoid, I have had rather a long experience, but I have never been able to obtain such brilliant results as those which have been put on record by so many authorities. I generally recommend it in those atypical cases of typhoid and paratyphoid which run a very long course, with low fever, while the general condition and pulse are fairly good. In such cases the vaccine treatment is sometimes useful.

I may, perhaps, be allowed to say a few words on the prophylaxis of the disease. There is no doubt, in my opinion, that the principal method of prophylaxis is to be found in the anti-paratyphoid inoculation. For many years, since 1905, I have carried out in Ceylon a combined inoculation against typhoid, paratyphoid A and paratyphoid B with satisfactory results. The mixed typhoid and paratyphoid A and paratyphoid B vaccine is based, like every other mixed vaccine, I think I may venture to say, on the experimental work I carried out in 1901-02 in Professor Kruse's Institute, when I was able to demonstrate that a rabbit inoculated with two or three species of bacteria produced agglutinins, and not only agglutinins but immune bodies, too, against all the germs injected, and the amount of agglutinins and immune bodies for each germ was the same as in control animals inoculated with one species only. Moreover, I was able to demonstrate that when immunization is obtained by one injection, the amount of immunization so obtained is not in proportion to the amount of vaccine injected. Provided you use the sufficient minimum quantity to produce the maximum immunity, you will obtain the same degree of immunity whether you inoculate an animal with that minimum amount or with a dose three, or ten, or twenty times as large. The mixed typhoid-paratyphoid vaccines I now generally use are prepared with broth culture killed by heat, and with carbolic salt emulsions without any heating. I may say at once that the latter vaccine, in my experience, is to be preferred, as it produces a milder reaction, and apparently it induces a larger amount of agglutinins in the inoculated people. Of this vaccine I give ½ c.c. the first time, and 1 c.c., or occasionally ½ c.c., a week later, in the arm, subcutaneously. It is also to be noted that very good results can be obtained even by giving a single injection.

The reaction is never very high in the inoculated persons, and, as a rule, they are able to resume their duties twenty-four or forty-eight hours after the injection. As demonstrated by myself, and more recently by Professor Dreyer, Ainley Walker, Gibson, and others, including Fleet-Surgeon Bassett-Smith, these inoculations produce agglutinins and other protective substances for the three germs — typhoid, paratyphoid A and paratyphoid B. Moreover, the amount of protective substances is not less for each germ than in control individuals inoculated with mono-vaccines.

What are the advantages of the mixed vaccine? The principal advantage is, that by a simple and rapid procedure, which takes exactly the same time as an ordinary typhoid inoculation, we are able to immunize soldiers against three diseases at the same time. It must be remembered, as was shown by Professor Dreyer, Ainley Walker, Sir Bertrand Dawson, and others, that paratyphoid A and B are not rare diseases; they may be rare in northern countries, but they certainly are not rare in countries like Serbia, for instance, or in Gallipoli, or in India, or in Ceylon. It must be remembered also—a point which I have tried to emphasize during the last ten years—that mixed infections occur, and they are not rare. I have seen several cases of mixed typhoid and paratyphoid A, typhoid and paratyphoid B, paratyphoid A and paratyphoid B. In fact, I may mention a case which I published three years ago: it was a case of triple infection with typhoid, paratyphoid A and paratyphoid B; and I do not think any doubt can be cast on the diagnosis of the case, because all three germs were found in the stools, and the blood contained agglutinins for those three germs. Moreover, the agglutinins were specific, as shown by the absorption test.

Then with regard to objections raised against the use of mixed vaccines. The most usual objection is that a mixed vaccine will probably give a much smaller amount of protection for true typhoid than does the ordinary typhoid mono-vaccine, and that typhoid being so much more important a disease than either paratyphoid A or paratyphoid B, it will not do to run that risk. This objection is not based on any experimental work; on the contrary, all experiments carried out so far tend to prove that the mixed vaccine induces the same immunity for true typhoid as the simple typhoid vaccination.

In my opinion, the only conclusion we can come to is, that the mixed typhoid, paratyphoid A and paratyphoid B vaccine should be used as a matter of routine in enteric prophylaxis, instead of the ordinary typhoid mono-vaccine.

DR. HENRY ROBINSON.

My interest in this disease is mainly clinical. My experience of it has been gained in France, where I have seen a certain proportion of the cases to which Sir William Leishman alluded. Sir Bertrand Dawson has told you of the symptoms of this disease, so I will do nothing more, in the time at my disposal, than mention briefly some of the more striking characteristics which the disease presents.

One of the previous speakers pointed out that the onset of the disease is often sudden; I can corroborate that statement. Shivers are not uncommon, they occur in about 30 per cent. of the cases. Headache and abdominal pain are, of course, the leading clinical symptoms; headache is present in nearly every case; abdominal pain occurs in a large majority, but not in such a high proportion as headache. Aching in the back, legs and arms is not uncommon. There are several symptoms frequently seen in true typhoid which are not so often met with in paratyphoid. In paratyphoid there is seldom marked abdominal distension, a contrast to true typhoid. Definite palpable enlargement of the spleen is also rare, though enlargement of the percussion area of the spleen is not unusual. Spots are very frequent indeed, but in many cases they do not appear until the pyrexia has subsided. It is essential to keep a most careful watch on these patients for the first week or ten days of their convalescence, otherwise a proportion in which spots appear will be overlooked. The spots are often of a larger and more palpable type than those of true typhoid; their distribution is the same as in typhoid. The abdominal reflexes are frequently absent, but may return during convalescence; this sign is of no value in differentiating typhoid from paratyphoid. The pulse-rate, as Sir Bertrand Dawson and others have told you, is very slow indeed, and very marked bradycardia is almost the rule during convalescence. A pulse-rate of 48, 44, or even 40 is seen in 60 to 70 per cent. of the cases, and it is not uncommon to find a man still with some pyrexia, to 100° F. or 101° F., and pulse-rate of 52 or 48. The period of pyrexia in paratyphoid fever may be from five or six days to three or four months. The longest period I have seen was nine weeks, but Lieut.-Col. Harvey, R.A.M.C., has put on record a case which had pyrexia for twelve weeks. Captain Torrens has lately[1] endeavoured to differentiate between paratyphoid A and B on clinical evidence alone, but I really do not think the attempt is worth making, as no appreciable difference can be made out clinically.

---

[1] *Brit. Med. Journ.*, November 13, 1915.

Captain Torrens lays it down that paratyphoid A, as a rule, has a slightly longer fever than the B variety. I thought so myself at one time, but after seeing more cases and considering the matter further, I concluded there was no practical help in the point. Until recently the shortest case I had seen was one of the B variety, but since then I have seen a paratyphoid A which has beaten it in this respect.

With regard to the overlooking of mild cases, I am in agreement with Professor Dreyer rather than with Sir William Leishman, but not on the same evidence which satisfies Professor Dreyer. I believe there are many undiagnosed cases—more than Colonel Leishman thinks—and I base that statement on clinical evidence. A point which confirms me in this belief is that in Captain Torrens's able paper he gives many statistics concerning the incidence of certain complications such as hæmorrhage, and the incidence of certain physical signs, as bronchitis, palpable enlargement of the spleen, &c. Most of the percentages in which these occur are higher than the percentages which I have encountered, and the differences can very well be explained in this way: Captain Torrens is in charge of a fever hospital in France, and the cases are sent to him with the diagnosis already made. The cases I saw I had to pick out myself from a general hospital, and as we were far from a fever hospital I had to see to them myself. Probably Captain Torrens does not get the proper proportion of mild cases; thus he speaks of the heavy aspect of the patient, the toxic appearance, the mental blurring; and these signs I have seen myself, but very much less often than Captain Torrens. For instance, he had severe hæmorrhage in 5 per cent. of cases of paratyphoid B, whereas I have not seen serious hæmorrhage in any paratyphoid case at all; and his death-rate was higher than mine.

Though I am no bacteriologist, I would like to make one or two remarks about the bacteriology, for I have one or two conundrums to put. First with regard to the Widal reaction. We have Professor Dreyer's method and the old-fashioned microscopical method; and what one as a clinician would like to know is, which is the right one? I have reports from a recognized London authority of the first rank. Here is one in which he gets a totally different result by Dreyer's method as compared with the microscopical method in the same patient's blood taken at the same moment; by Dreyer's method the serum agglutinized *Bacillus typhosus* in a dilution of 1 in 250, but did not agglutinate *paratyphosus* A or B at all; by the microscopic method *typhosus* was slightly agglutinated at 1 in 160, *paratyphosus* B not at all, *paratyphosus* A fully at 1 in 320. Both cannot be right; one must be wrong, possibly both are.

Positive Widal reactions are sometimes found to disappear very rapidly after the fever is over. You may have a paratyphoid case with a positive reaction for the particular microbe which is isolated from the blood or fæces; if you follow up the patient a month or six weeks later, the positive agglutination reaction may have disappeared, and in some cases doubt has been thrown on the diagnosis in consequence. In one patient whom I traced I learnt that in hospital in England the Widal was negative to *paratyphosus* A and B, but at the same time he was found to be passing bacilli in his urine and was a carrier. He had shown a positive Widal when in my charge in France, but lost it later.

I would like to ask what importance is to be attached to the discovery of the *Bacillus alkaligenes fæcalis*. I had two cases in France in which this bacillus was isolated from the fæces. Since returning to England I have met with two cases in which it has been isolated from the blood; in one of these two it was also present in the fæces. Clinically, all these four were cases of the enteric group. I shall be glad if bacteriologists can elucidate these rather difficult points.

Captain H. L. Tidy, R.A.M.C.

Paratyphoid bacilli have been isolated from sixty-six cases at the British Red Cross Hospital, Netley. There are two bacteriological methods of diagnosis: (1) isolation of the bacilli; (2) agglutination tests. With regard to agglutination, there are two main techniques—microscopic and macroscopic. They are both reliable, and for diagnostic purposes no further elaboration is necessary beyond the ordinary well-recognized precautions described in text-books. When agglutination tests are performed in paratyphoid cases, agglutinins to *Bacillus typhosus* are absent very frequently, even in men who have been inoculated within eight months. Sometimes these agglutinins are present early, then disappear, and later may reappear. In severe septic conditions agglutinins to *Bacillus typhosus* are also absent. Apparently marked pyrexia, perhaps 102° F., for five days leads to disappearance of the inoculation agglutinins. Milder febrile conditions also seem to cause proportional diminution. This factor, therefore, is of importance in statistics on the duration of agglutinins based on wounded men. If an inoculated man becomes infected with *Bacillus typhosus*, the inoculation agglutinins will be removed by the resulting fever, and then later infection agglutinins will develop. Consequently a positive agglutinative reaction to *Bacillus typhosus* after the sixth day of pyrexia is as definite a proof of typhoid fever in an inoculated man as in an uninoculated one. Immunity conferred by inoculation perhaps may be affected by pyrexia simultaneously with the agglutinins. It is possible that the agglutinins are converted into agglutinoids, and as such may account for some of the peculiarities of agglutination which occur in inoculated men.

For the isolation of bacilli from the stools Lieutenant J. P. Dunn and I have obtained the best results with the brilliant-green enrichment method suggested by Dr. Carl Browning. A few loopfuls of fæces are rubbed in 5 c.c. of peptone water (not broth) to which 0·2 c.c. of 1 in 10,000 solution of brilliant-green has been added. The tube is incubated for twenty-four to forty-eight hours, and then plated. This is the simplest form of the method. The inhibition of *Bacillus coli* is very marked. For the plating McConkey's medium is preferable. With Endo's medium a difficulty arises from the occurrence of colourless colonies of *Bacillus coli.* Two points must be noted in the brilliant green method. First, it encourages the growth of non-pathogenic non-lactose fermenters, especially *Bacillus fæcalis alkaligenes.* The colonies of this bacillus usually grow with a characteristic crinkled edge, and can generally be avoided. Secondly, dysentery bacilli will not grow in brilliant-green. Culture of the stools must therefore also be taken directly into broth, at any rate for the first examination. This will be plated the same day, while the brilliant-green tube may be incubated safely for forty-eight hours. With Professor Dreyer's arc lamp we have been unable to obtain any specific action. It appears to kill *Bacillus coli* rather less than it does typhoid bacilli. Its main action is to produce a series of areas with varying thicknesses of growth, and thus ensures a portion with the best distribution for the selection of colonies for subculture.

For diagnostic purposes the isolation of bacilli is far more valuable, and usually costs but little more labour than the agglutination reaction. While bacilli are still present in stools, agglutinins may be entirely absent. This is especially frequent in wounded men.

Major C. Miller, R.A.M.C.

The following is a brief report of observations on paratyphoid fever, as seen at the Red Cross Hospital, Netley:—

Frequency.—(*a*) Cases from Gallipoli: (1) Of enteric fever, fully nine-tenths were paratyphoid infections; (2) of dysentery, rather more than half were paratyphoid infections. (*b*) From France: A few cases of enteric fever have occurred in the wounded. Paratyphoid and typhoid infections were about equal.

Severity.—Paratyphoid infections causing enteric fever are no milder than typhoid as regards toxic effects. Compared with cases inoculated against *Bacillus typhosus*, they are more severe.

Duration.—The course of the disease is usually shorter than in cases of typhoid fever seen in London hospitals.

Relapses are frequent, but mild.

Clinical Features.—(1) The tongue is often moist and clean, even with a high temperature. (2) The spleen is enlarged as in typhoid. (3) Intestinal symptoms: Diarrhœa and constipation occur as in typhoid; hæmorrhage has been rare and only slight; perforation has not occurred. (4) Spots are usually present, and in fair number; in a few cases these have been as thick as in measles; fresh crops of spots commonly appear in convalescence without any other symptoms. (5) Bronchitis occurs as in typhoid. (6) Thrombosis of veins of legs appears to be more common than in typhoid. (7) Jaundice of the catarrhal type, with and without abdominal pain, is fairly common. (8) Temperature rises as in typhoid, but in some cases more abruptly; the pulse does not quicken in proportion, and this behaviour of pulse and temperature is the best early sign by which to distinguish typhoid and paratyphoid infections from septic infections.

The dysentery caused by paratyphoid infections is the most severe disease that has been seen at this hospital. The majority and the most severe cases were due to *paratyphosus A*. In this disease the patient is in a pitiful condition. He is emaciated, blue, and almost pulseless. The voice is feeble and toneless. There is frequently a petechial rash, and sometimes there are large subcutaneous and cutaneous hæmorrhages. There are frequently aphthous stomatitis and pharyngitis. The abdomen is tender. There is a constant flux of pink mucus passed in small quantities with much straining and tenesmus. Frequently there is loss of control over bladder and rectum. The mortality of patients in this condition is high.

In my opinion the differential diagnosis of paratyphoid infection from typhoid and from each other cannot be made clinically.

Captain KENNY (Canadian Hospital, Taplow).

We have had a comparatively small series of cases at Taplow at the Canadian Red Cross Hospital there, but they have been drawn from many sources. Our difficulty has not been to distinguish the difference between paratyphoid and the more severe fever of typhoid, but, in the earlier groups of cases, the difference between dysentery and paratyphoid.

The first cases came to the hospital from Gallipoli, and consisted very largely of New Zealanders; fortunately, one of these cases came "in full bloom," if I may use this term. There was fever of 102° F. and 103° F., spots, enlarged spleen and enteritis; so we knew we were dealing with typhoid in some form. We used the microscopic agglutination method, and although this patient had been inoculated twice, there was no agglutination towards the *Bacillus typhosus*. On further investigation we found his to be a more interesting case than one would have thought. He gave an agglutination both towards paratyphoid A and paratyphoid B. In the other cases the bacteriological study was simpler. One was a straight typhoid, giving an agglutination reaction to 1 in 2,500, and the others were mostly of the B variety. There were eleven cases in the series which we think are typhoid; some are absolutely established, and others still under consideration. Twenty-two cases have been established as paratyphoid B, three cases as A, and two cases of mixed A and B infection.

The methods we used in studying the bacteriological side were, first, the agglutination method by means of the microscope, and later on, through the kindness of Sir William Osler, Professor Dreyer's method, and that has been very satisfactory. I think one must admit that a method which can establish your diagnosis when one has a patient with fever, enteritis, spots and a large spleen, all or any of them, and that tells you the exact infection you are dealing with, is very serviceable. Broadly speaking, it is quite satisfactory in our hands. The older method has been satisfactory in the study of typhoid in the past, but for a busy pathologist in a large hospital it takes too long. We have 900 beds, and our pathologist has very little trained assistance, and there is all the other pathological work going on at the same time. He must therefore use the method which is the most convenient. And I think clinicians will have to be governed by the bacteriologists, provided this method is equally reliable.

One of the cases in the series is especially interesting. It came in as a typical picture of what has been displayed in many lands, an example of what famine can do. On admission, the patient was gaunt and emaciated, his eyes were alight with fever, he had marked enteritis, and while at Taplow his greatest number of stools was nineteen in twenty-four hours. He went rapidly downhill, fever began on the fifth day, and on the twenty-seventh day he died. At the autopsy we found an interesting condition. There was typical inflammation of the small intestine, with ulceration of Peyer's patches; the large intestine was also deeply inflamed and thickened—not the solitary follicles alone, such as we saw in the examples shown at the last meeting. There was rather a general inflammation, giving the large bowel a leathery appearance, more severe at certain spots. At the beginning of the large bowel the cæcum was intensely inflamed, that is to say, the mucosa was thickened and congested. The rectum also was extensively inflamed. So we were definitely dealing here with a case of dysentery, and on the top of that we had definite lesions of typhoid in the small bowel.

We have had very little to do with trench fever. Two cases have been admitted with this diagnosis. One came in with mild nephritis, probably an end-result. Another was admitted which had been diagnosed in France as trench fever, but it gave an agglutination to paratyphoid B.

We have had two cases of jaundice from France, one of which had not been vaccinated against typhoid. He gave a positive typhoid agglutination. The other case had been inoculated, and has not been definitely established as typhoid, but it is likely to turn out to be so, as both came from the same district and were very similar clinically.

I am not acquainted with the value of inoculation by various combined vaccines, and therefore I will not occupy your time further.

Dr. C. H. Browning.

I was much gratified to hear the favourable criticism pronounced by Captain Tidy on our method of isolating both the typhoid and paratyphoid organisms from the fæces by means of brilliant-green in fluid medium. I would merely add to what Captain Tidy has said that I have gathered from numerous sources what are now the practical results of observers under the stress of hard work in France, and they agree with Captain Tidy in the fact that the method, in its abbreviated form, while taking up little more time than the old methods, yields results which are much more satisfactory. Thus, typhoid and paratyphoid organisms have been frequently isolated from the fæces by our procedure where, by direct plating, they could not be found at all. The method has now been reduced to its simplest form and does not require more time than less efficient procedures.[1]

With reference to the interpretation of the results of agglutination tests with patients' sera, I have found with great satisfaction that I was in accord with the opinion of so distinguished an observer as Sir William Leishman. I think we must adopt an exceedingly careful and waiting attitude before concluding that the occurrence of small changes in the agglutinin content of a patient's serum can be taken as diagnostic of a particular infection.

Dr. E. STOLKIND (Moscow and Nervi, Italy).

I shall briefly discuss the clinical forms of paratyphoid fever. According to some authors there exists only one form of paratyphoid—the typhoid form. For example, Professor Osler, in his "Principles and Practice of Medicine," 1912, makes the following statement: "There is nothing in the clinical or anatomical features of paratyphoid fever to differentiate these cases from ordinary typhoid fever, and for practical purposes they may be considered the same disease." Professor Bainbridge says: "The clinical symptoms are, as a rule, indistinguishable from those of enteric fever; an acute outbreak of acute gastroenteritis is caused by the consumption of infected meat (*Bacillus suipestifer*), &c." With the opinions expressed above I cannot entirely agree. Cases of paratyphoid fever up till now have been described in thousands.

Clinically and pathologically there is no difference between paratyphoid A and B, which vary only bacteriologically (Stolkind). In the literature I found more than eighty cases of autopsies. Some cases, in my opinion, are doubtful and have not been proved. If we add to these the fifteen cases in English soldiers (in France) (Dawson, Torrens and Whittington, &c.), and our not yet published cases, this will bring the number up to 100 necropsies. The pathological changes we may class as follows:—

(1) Cases in which at the autopsies morbid changes have been found similar to those of typhoid fever; twelve such cases have been described (Barykin, Birt [paratyphoid A], Brion and Kayser, Buday,

---

[1] The practical details of the method for the isolation of typhoid and paratyphoid bacilli from fæces by means of brilliant-green and telluric acid in fluid medium are contained in the following paper: Browning and Thornton, *Brit. Med. Journ.*, August 14, 1915.

Burckhardt, Castellani [paratyphoid A], Ellermann, Rings, Saltykow, Wineckel, &c.).

(2) Over twenty-five cases have been observed in which the lesions were those of acute enteritis, acute gastro-intestinal catarrh, &c. (Bingel, Blackwell, Job and Hirtzman, Bofinger, Fowler, Heller, Hübschmann, McWeeney, Hedinger, Monier and Riberau, Lorey and Stolkind, Strong, &c.).

(3) Ten cases with lesions similar to dysentery (Burckhardt, Herford, Lucksch, Wells and Scott, Hübschmann, &c.).

(4) In about ten cases (perhaps owing to a short duration) transition forms have been found—namely, swollen follicles or Peyer's patches (Barykin, Firth, Longcope, Lorey and Stolkind, Pepere, Saltykow, &c.).

(5) In many cases the lesions were the same as in septicæmia.

(6) In some cases no lesions were found in the gastro-intestinal canal.

From these autopsies we gather that in paratyphoid fever the morbid changes are not only similar to those of typhoid, but also to those of acute gastro-intestinal catarrh, dysentery, &c. Paratyphoid as well as typhoid fever is only a symptom-complex [Stolkind].

Referring to cases which I have observed in Moscow and during my study in the clinics abroad, and to those stated in literature, I find it correct and quite practical to keep to the following clinical classification of my own:—

(1) The influenzal form of paratyphoid fever, or respiratory paratyphoid.

(2) The gastro-intestinal form.

(3) The choleraic form.

(4) The typhoid form of paratyphoid.

I must add that the clinical classification of paratyphoid, as in most other diseases, is: (1) schematic; (2) mostly based not only on pathological, but also on clinical symptoms; and (3) that by no means seldom we find atypical cases, or transition forms, in which the disease begins with a combination of two forms, or with one form, changing later into another form.

Besides these four principal forms we meet also with cases of paratyphoid infection of separate organs, cases which we may call, for example, meningitis paratyphosa, appendicitis paratyphosa, cholecystitis paratyphosa, pyelitis paratyphosa, &c. Paratyphoid fever may also appear as a secondary disease.

Let us take the first form of paratyphoid, which I have proposed to call "the influenzal form of paratyphoid" (respiratory paratyphoid), because clinically this form does not differ from respiratory influenza. The first typical case of the influenzal form of paratyphoid I observed in Moscow. The patient, aged 38, was suddenly attacked with coryza, cough, sore throat, headache, moderate fever, lassitude; the spleen was slightly enlarged and there was constipation. On the ninth day several spots appeared on the abdomen, which looked somewhat like roseolæ. Pulse was 78 to 98; irregular fever during fourteen days. During the last eleven days the patient perspired very much. Bacteriologically it was found to be paratyphoid B (*Bacillus influenzæ*, Pfeiffer, was absent). Later I observed other cases. Dr. Beliaew, in Moscow, relates a case of paratyphoid B, in which the patient had coryza, sore throat, cough, bronchitis, fever, lassitude, sleeplessness, enlarged spleen, &c. Allen described a case of paratyphoid in a male (Australian); the attack began with coryza, cough, headache, diarrhœa, &c. Dr. Baer observed an epidemic of paratyphoid in fifty-six soldiers, all of whom had fever, conjunctivitis, pharyngitis, &c., some of them bronchitis. Grattan and Wood, and also Sufford, have observed cases of paratyphoid A in English soldiers in India, in which the attack might easily be mistaken "for an onset of influenza"; in many cases there were symptoms of sore throat, bronchitis, and the conjunctivæ were suffused. Rolly observed a case of paratyphoid with status typhosus, angina catarrhalis, laryngitis acuta with erosions as in influenza. Wilucki lately observed an epidemic of thirty-three cases of paratyphoid fever B. In seven cases the onset began suddenly with shivering, fever, lassitude, coryza, sore throat, bronchitis, conjunctivitis, headache, &c. Wilucki, &c., call these forms of paratyphoid "influenza paratyphosa" (Stolkind). Similar cases of an influenzal form of paratyphoid fever have been described by Conradi, Drigalski, von Jürgens, Bofinger, Lentz, and Walker. Reuss and Schiller observed an epidemic of paratyphoid B with coryza, sore throat, conjunctivitis, &c.

From the above examples we see that the form of paratyphoid fever which I have proposed to call "influenzal form of paratyphoid" (respiratory paratyphoid) without any doubt distinctly exists and has been observed by many other authors.

With regard to the second form of paratyphoid—"gastro-intestinal form"—the symptoms of which simulate catarrhus gastro-intestinalis acutus or enteritis acuta, and also dysentery, many such cases will be described later on by Lorey and myself. The following case of my own began with the symptoms of dysentery. It was a case of mixed infection of paratyphoid B and measles (morbilli), which possesses a certain interest because I believe it to be the only case of its kind described up to the present.

An infant, aged 1 year, in Moscow, was suddenly attacked with fever and diarrhœa; on the second day there was frequent desire to go to stool, with straining and tenesmus, with mucus and blood; afterwards prolapsus recti, great apathy and weakness. A few days later there was bronchitis with slightly enlarged spleen and liver. On the eleventh day the child was infected with measles (morbilli), and fourteen days afterwards it developed all the typical symptoms of measles. This was followed by different complications—thrush, stomatitis ulcerosa gravissima, pneumonia, very great enlargement of the liver, heart failure, &c. Convalescence was established after twelve weeks. Bacteriologically, this case was distinctly diagnosed as one of paratyphoid B.

The third clinical form of paratyphoid is the choleraic form, which simulates cholera Asiatica or cholera nostras. Such cases have been described by many authors (Gaffky, Sachs-Mücke, Kutscher, Bracht, &c.).

The fourth form of paratyphoid is the typhoid form. Many such cases have been observed before and also now (Stolkind [clinic Professor V. Patella], Lorey and Stolkind, Dawson, Torrens and Whittington, Robinson, Castellani, &c.).

With respect to the differential diagnosis in paratyphoid fever, as in all other infectious diseases, the diagnosis must be based first on clinical symptoms. We know that in typhoid fever the correct clinical diagnosis without bacteriological examination is generally made in only 30 to 40 per cent. of the cases. For example, in the south-west of Germany, between 1904 and 1909, in 8,547 cases of typhoid and paratyphoid fever, the diagnosis, based only on the clinical symptoms, was correct in 38 per cent.; in the other 62 per cent. the diagnosis was possible only after bacteriological examination. It is possible to diagnose clinically paratyphoid without bacteriological examination in exactly the same way as typhoid fever, influenza, malaria, &c. The possibility of paratyphoid must be borne in mind:—

(1) In all cases of so-called "food poisoning," which in the great majority are caused by *Bacillus paratyphosus* B, or *Bacillus suipestifer*, or *Bacillus enteritidis*, Gaertner.

(2) In cases of enteritis acuta or catarrhus gastro-intestinalis acutus and acutissimus (cholera), or dysentery (in children and adults).

(3) In cases with symptoms of influenza.

(4) In cases of infectious diseases with "status typhosus."

In diagnosing paratyphoid, we must take also into consideration cases in which there are clinical symptoms of septicæmia, incipient tuberculosis, malignant endocarditis, malaria (I have observed a case of paratyphoid B which simulated malaria), &c. The diagnosis of paratyphoid is only certain when we have symptoms of one of those already mentioned forms of paratyphoid, and when it has been proved bacteriologically.

As regards prophylactic measures, I am greatly in favour of vaccination, and in my opinion it ought to be used for the soldiers at the Front in the form of mixed vaccines as first used by Professor Castellani, and later by Vincent, Leishman, Dreyer, Walker and Gibson, Kabeshima, Widal, and others.

As regards the therapy of paratyphoid fever, I used to give the patients, with good results, sufficient calories (in typhoid fever I employed this treatment over thirteen years). Vaccine therapy in many cases gives good results.

BIBLIOGRAPHY.

BAINBRIDGE. *Lancet*, 1912, i, pp. 705, 771, 849.
CASTELLANI. *Brit. Med. Journ.*, 1915, ii, p. 711.
DREYER, WALKER, and GIBSON. *Lancet*, 1915, i, pp. 324, 403, 613.
REUSS and SCHILLER. *Militärärzt*, No. 27 (*Wien. med. Wochenschr.*, 1915, No. 46).
ROBINSON. *Lancet*, 1915, ii, p. 851.
STOLKIND. "Mixed Infection of Paratyphoid B and Measles," *Med. Obozrenie*, 1907.
Idem. "Zur Klinik d. Paratyphus u. zur Kasuistik von Mischinfektion an Paratyphus B u. Masern," *Archiv f. Kinderheilk.*, 1909, xlix, p. 34.
Idem. "Contributo alla clinica del paratifo (Clinica V. Patella, Siena)," *Clin. med. ital.*, 1912.
Idem. "Die Klinik des Paratyphus," *Würzb. Abhandl.*, 1912, xii, No. 7 (with references).
Idem. "Typhoid and Paratyphoid Infection," Petrograd, 1916 (Russian).
TORRENS and WHITTINGTON. *Brit. Med. Journ.*, 1915, ii, p. 697.
WILUCKI. *Archiv f. Schiffs. u. Tropen-Hygiene*, 1915, xix, Heft 12, p. 321.

Sir WILLIAM OSLER, Bt., F.R.S.

We may congratulate the Section on having had a very satisfactory and fruitful discussion. And we have been particularly fortunate in having with us Sir Bertrand Dawson and Sir William Leishman, bringing us good first-hand clinical material from the Front. It is late, so I will not read my communication, but I would like to make a correction of a statement which has been made in the journals that, clinically, paratyphoid was first recognized in my clinic in the case recorded by Dr. Norman Gwyn. The first clinical recognition of paratyphoid fever is due to our distinguished colleague Achard, of Paris, who published cases in 1896. I show you his charts on the epidiascope, and also those of the case in my clinic reported by Gwyn.

Medical Section.

President—Dr. A. E. GARROD.

(*November* 23, 1915.)

Bismuth—X-ray Localization of Dysenteric Ulceration.

By C. J. GLASSON, M.D.[1]

(Communicated by Colonel Sir RONALD ROSS, K.C.B., F.R.S., A.M.S.)

CASE I.

LIEUTENANT A., aged 21, was sent back from G——, where he had been suffering from a fairly acute diarrhœa for three weeks. On admission (August 8, 1915), patient stated that he had had several stools in which were blood and mucus; sometimes tenesmus at first, but that this was better. Temperature 102° F.; tongue coated; pulse fair, 82. There was distinct tenderness over region of cæcum, transverse colon, and descending colon. Bacteriological examination gave amœbæ and mucus, but no pus. Placed upon emetine, 1 gr. daily by injection, and bismuth subnitrate, 30 gr. three times a day in water.

On August 28 a radiogram was taken of this patient, which showed the whole of the large intestine from the cæcum to the sigmoid flexure to be filled with bismuth. The patient then left off the bismuth, and 1 oz. of liquid paraffin was given at eight o'clock of the same day. On August 29 the bowels were freely evacuated, and on August 30 a second radiogram was taken. This showed the whole of the large intestine quite clear from the bismuth and fæces, but leaving shadows in the cæcum and transverse and descending colons, where the bismuth had been left behind in the ulcers—the position of these shadows corresponding to the clinical signs.

---

[1] Radiographer to a General Hospital, Lieutenant R.A.M.C. (T.C.).

Radiogram (fig. 1) shows the larger intestine filled with the bismuth.

Radiogram (fig. 2), by means of the arrows, shows the darker shadows where the ulcerative patches are.

This case was under the care of Lieutenant L. D. Shaw, M.D., R.A.M.C. (T.C.).

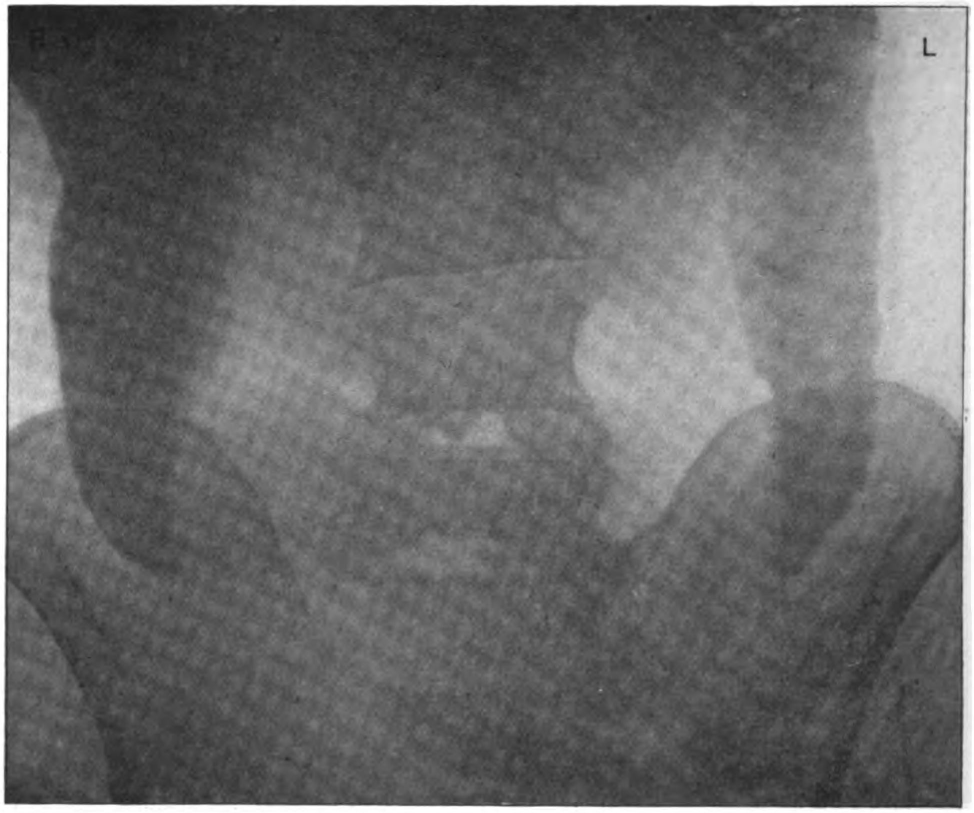


FIG. 1.

CASE II.

Stoker B., aged 24. This was a case of typhoid followed by dysentery; admitted on September 11, 1915. History: Never inoculated against typhoid. Patient was admitted as a case of typhoid, which was confirmed by a bacteriological examination and a positive Widal reaction with *Bacillus typhosus*, and a weaker agglutination with paratyphoid B. Patient did well up to October 9, when he had severe abdominal pains, followed by ten stools largely composed of mucus, blood, and pus. A stool was examined on October 18 microscopically, and found to contain entamœbæ and pus cells. Patient was then immediately put upon emetine, ½ gr. twice a day, and bismuth subnitrate, 20 gr. every two hours. Condition of patient very bad; much emaciation. Abdomen very tender.

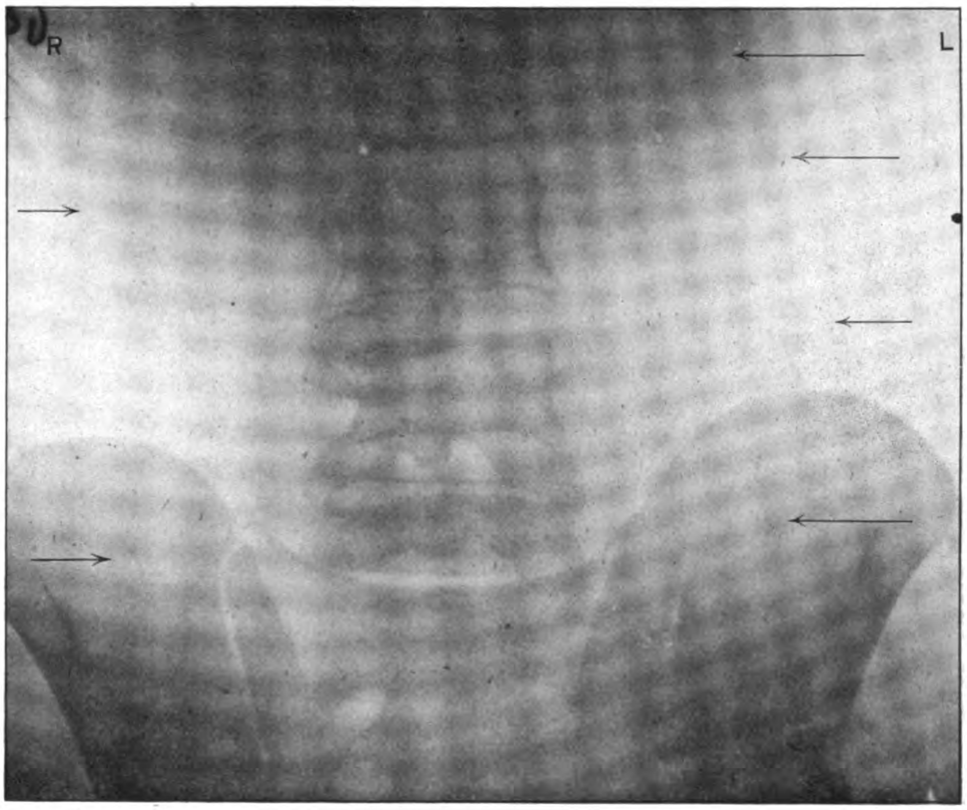


FIG. 2.

On October 20 a radiogram was taken of this patient and showed no collection of bismuth as in the others, but dark shadows were to be seen at end of transverse colon, splenic flexure, and all down the descending colon into the sigmoid flexure. As the condition of this patient was bad I did not think it advisable to take a second radiogram.

Radiogram (fig. 3) shows distinct shadows, marked with arrows.

On October 24 this patient died, and the post-mortem examination showed that, from the cæcum to the anus, the whole of the larger intestine was ulcerated, very little mucous membrane being left, and the bismuth held in the position shown by the radiogram.

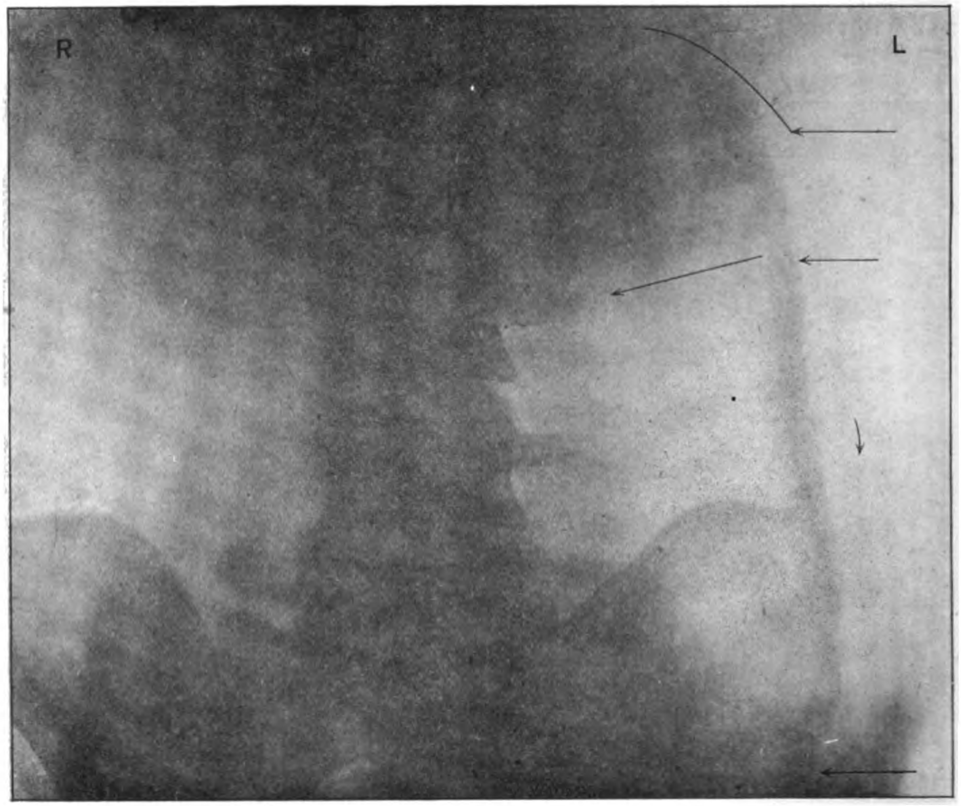


FIG. 3.

CASE III.

Private S., aged 21. This case was admitted into hospital as a case of typhoid (convalescent) from A——. Had been inoculated twelve months ago. On admission (October 4, 1915), this patient showed no signs of any active disturbance. Temperature normal; no diarrhœa or pain. Was placed upon milk diet, which was increased on October 8 by porridge, custard, and eggs, and on October 10 by chicken.

On October 16 he was seized with severe abdominal pain, chiefly referred to the region of umbilicus; had six stools in which were seen blood and mucus. The stools were at once examined bacteriologically, and found to contain blood, pus, and hæmamœbæ. He was at once placed upon emetine, ½ gr. twice a day, and bismuth subnitrate, 90 gr. every two hours during the day.

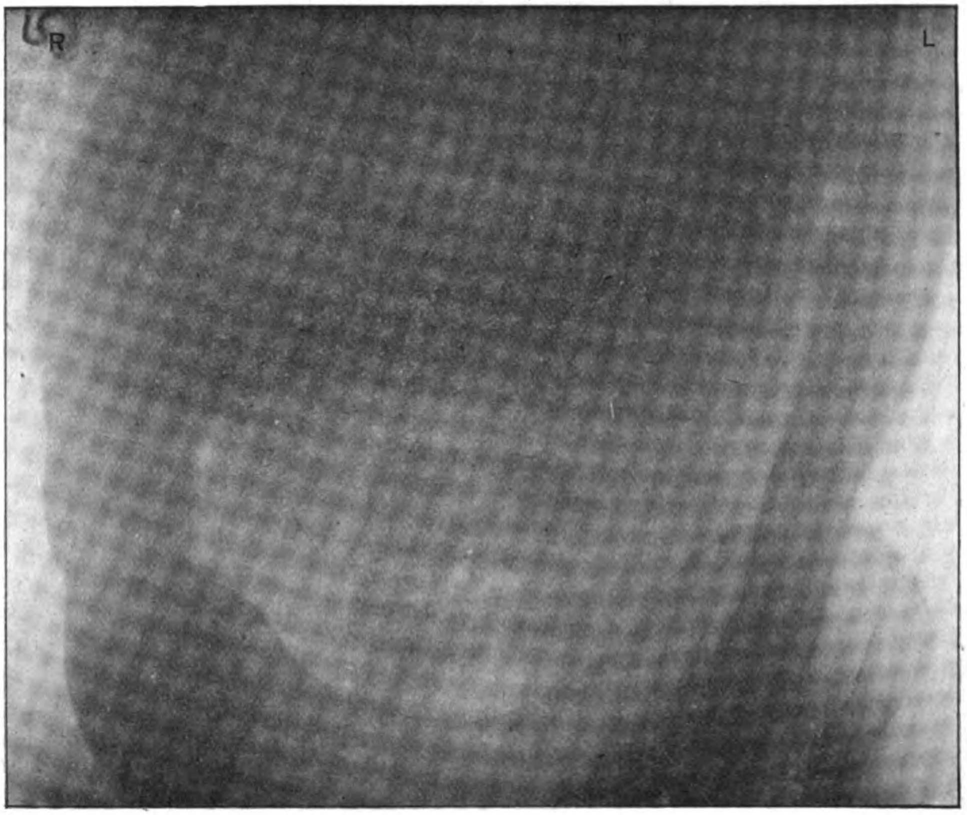


FIG. 4.

Captain Blacker, F.R.C.S.Eng., F.R.C.P.Lond., R.A.M.C. (T.C.), examined this patient and found him tender over the hepatic flexure of the colon, less tender over brim of pelvis of left side.

A radiogram (fig. 4) of this patient was taken on October 20 and showed the large intestine, from cæcum to sigmoid flexure, full of bismuth; it is also to be noticed in the cæcum that the shadows are darker in parts, evidently where ulceration is.

A second radiogram (fig. 5) was taken on October 23, after the patient had been treated with liquid paraffin, and shows distinct lines of ulceration in the cæcum, extending up into the ascending colon; shadows over the hepatic flexure, splenic flexure; the descending colon still containing some bismuth.

Patient has done well since.

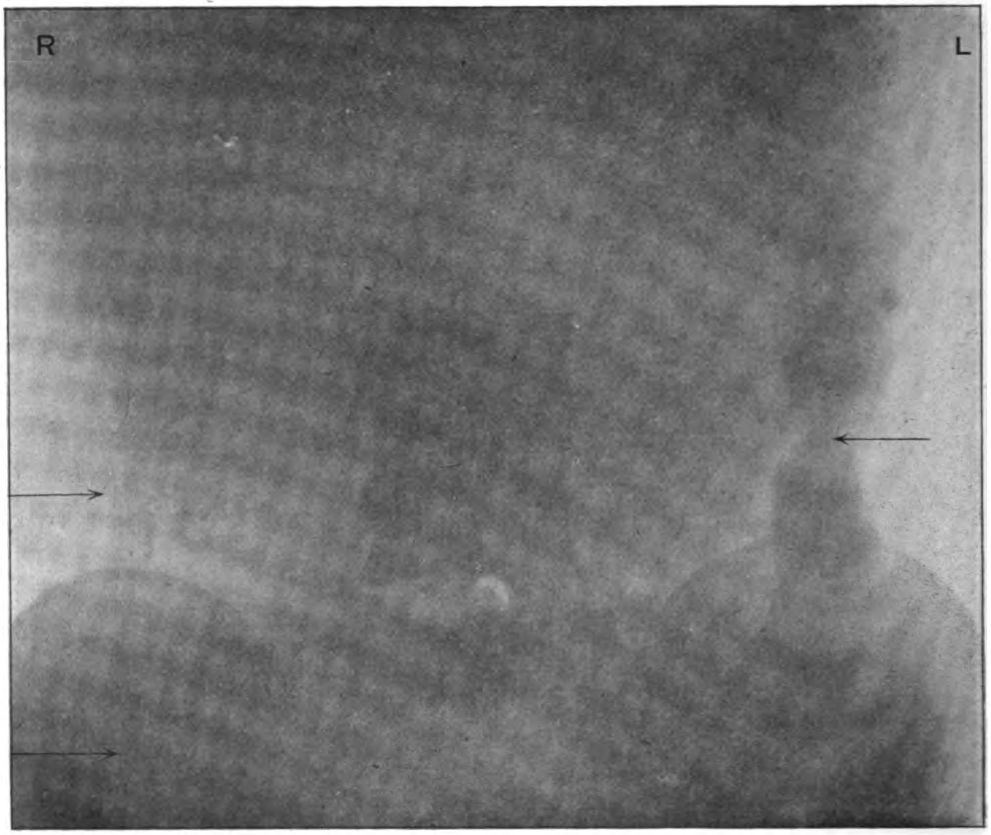


FIG. 5.

CASE IV.

Private C., aged 25. This patient was admitted on September 13, 1915, from a convalescent home to which he had been sent from a general hospital, where a bullet was successfully removed from his right thigh on August 8. Had diarrhœa for eleven days before admission, but there was no history of having passed blood. Temperature on admission 101° F., pulse 100. Patient was supposed to be suffering from typhoid. On September 20 the spleen was palpable, but there was no rash nor typanites. Complaining of pain in his right thigh, patient was found to have a pulsatile swelling with a systolic thrill on inner aspect of upper part of right thigh. This turned out to be a traumatic aneurysm, which was operated upon on September 13, the result being successful.

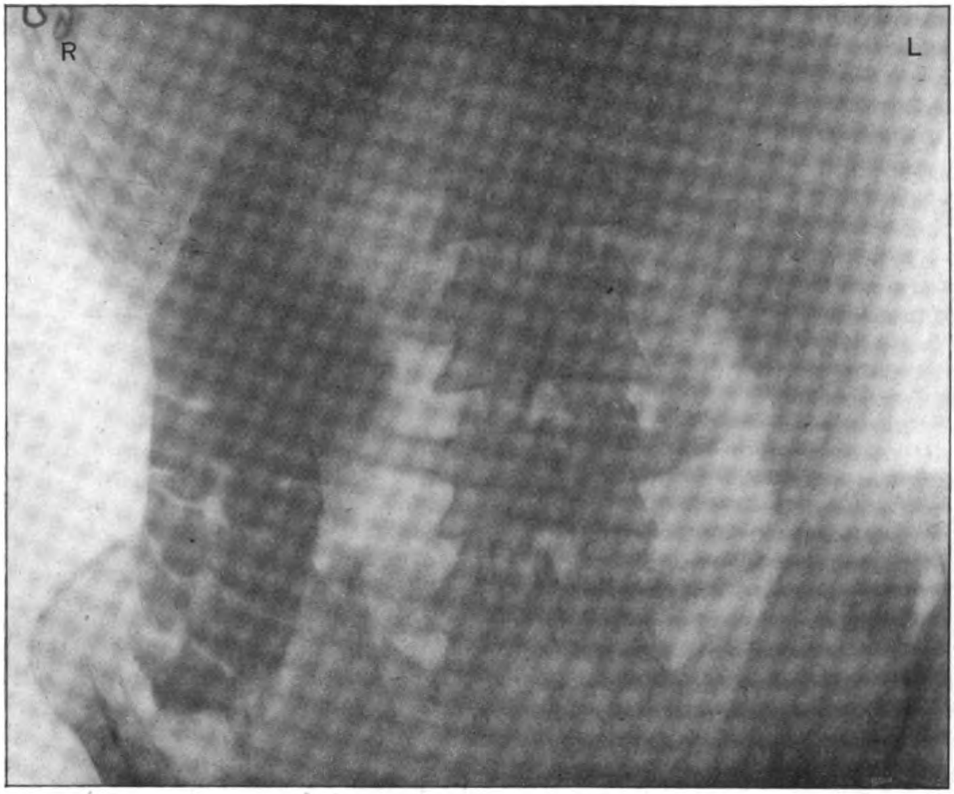


FIG. 6.

Up till October 16 patient was doing well, but on this day he had severe pain in the abdomen, accompanied by diarrhœa. Next day the stools contained pus, mucus, and blood. A stool was sent to Sir Ronald Ross, who found in it flagellates, eggs of oxyuris, and *Hæmamœba histolytica.* Patient put on ½ gr. emetine twice a day; given a dose of castor oil. Next day he was put on bismuth subnitrate, 60 gr. every two hours during the day, abdominal pain, diarrhœa, and tenesmus continuing for the next two days.

Captain Blacker examined this patient on October 20, and found him most tender in the area corresponding to the last two-thirds of the transverse colon; also tender over the descending colon and sigmoid flexure.

Radiogram (fig. 6) taken on October 20 showed bismuth mixture to have filled the cæcum, ascending colon, part of the transverse colon, and some parts of the descending colon. Bismuth discontinued and liquid paraffin given in dessert-spoonful doses every two hours for one day.

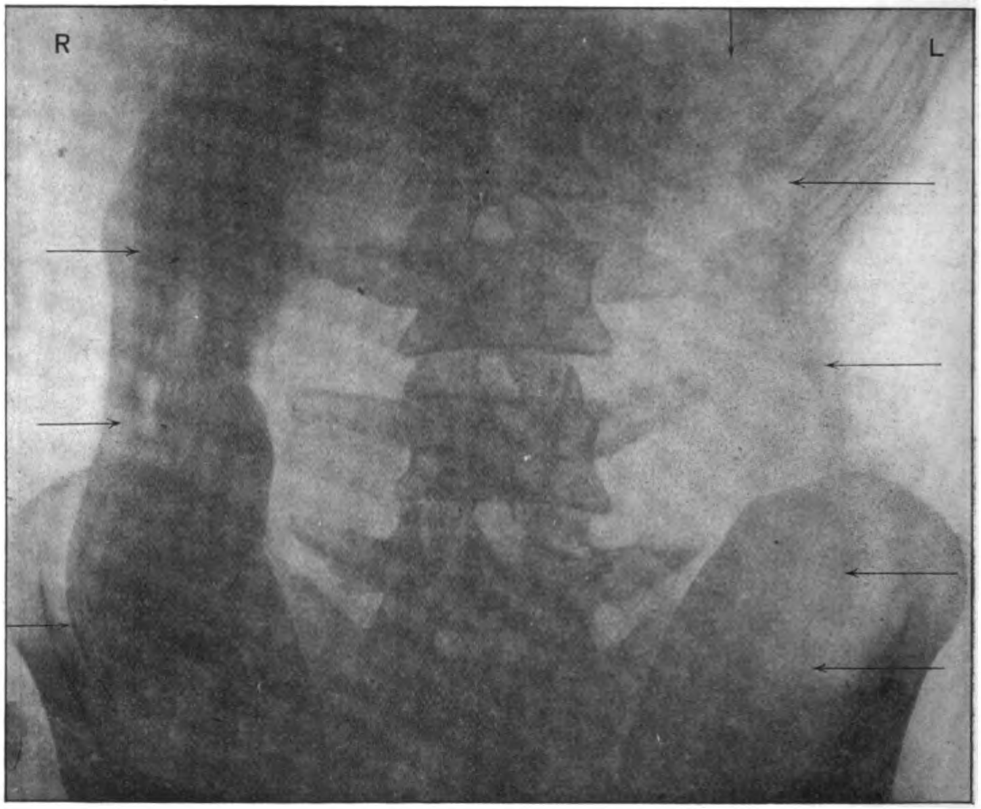


FIG. 7.

Second radiogram (fig. 7) taken on October 22 showed cæcum and ascending colon still containing some bismuth, but distinct shadows from splenic flexure all down the descending colon where the ulceration was.

This patient has done very well since and is now much better.

CASE V.

Private B., aged 19. Admitted into hospital on September 25, 1915, as a case of typhoid. Temperature 103° F., pulse 92. Mental condition dull and stuporose, with dry, brown, cracked tongue. Positive Widal reaction, *Bacillus typhosus*. Tenderness over cæcum and sigmoid regions, some tympanites. No active diarrhœa present; faint rash became visible in abdomen. Up till October 11 disease gradually resolved itself. Patient given chicken on October 19. On October 21 patient had abdominal pains and diarrhœa, which contained blood and mucus. Stools examined bacteriologically and entamœbæ found; placed on emetine, 1 gr. daily, and bismuth subnitrate, 60 gr. every two hours during the day. From October 23 to 26 patient had severe diarrhœa.

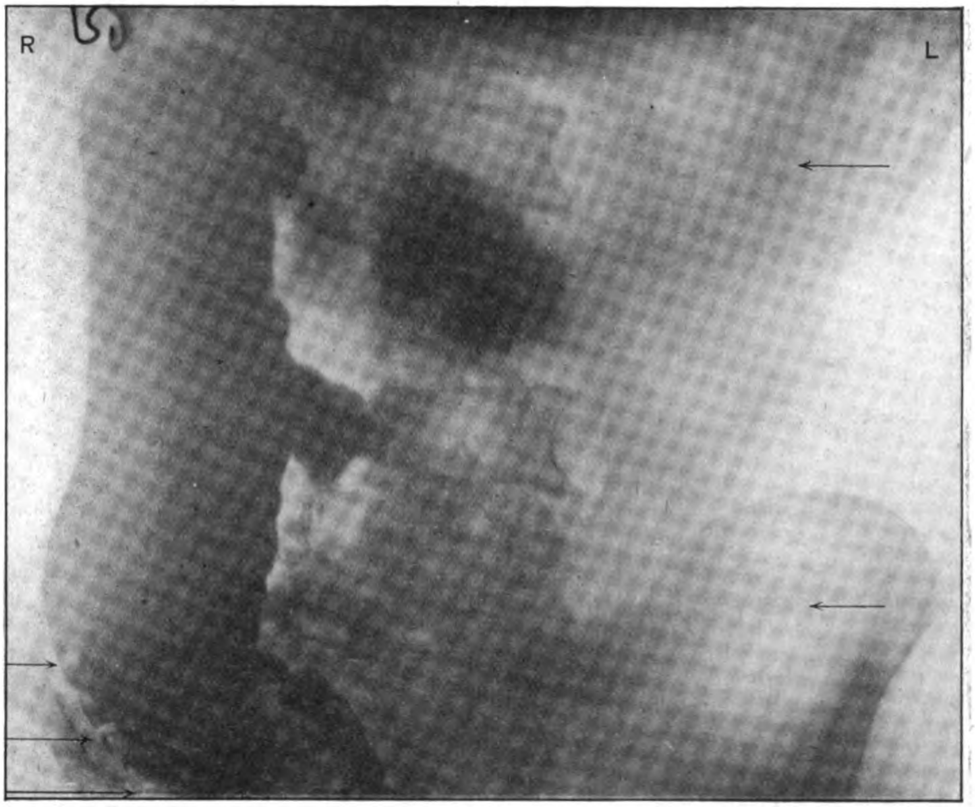


FIG. 8.

with tenesmus, but this gradually got better, and on October 30 a radiogram (fig. 8) was taken and showed the cæcum, ascending and hepatic portion of transverse colons filled with bismuth. At the splenic flexure and upper part of descending colon shadows were present which indicated that some bismuth was lying in ulcerative patches. Bismuth left off, and liquid paraffin was given, 2 dr. every four hours for twenty-four hours.

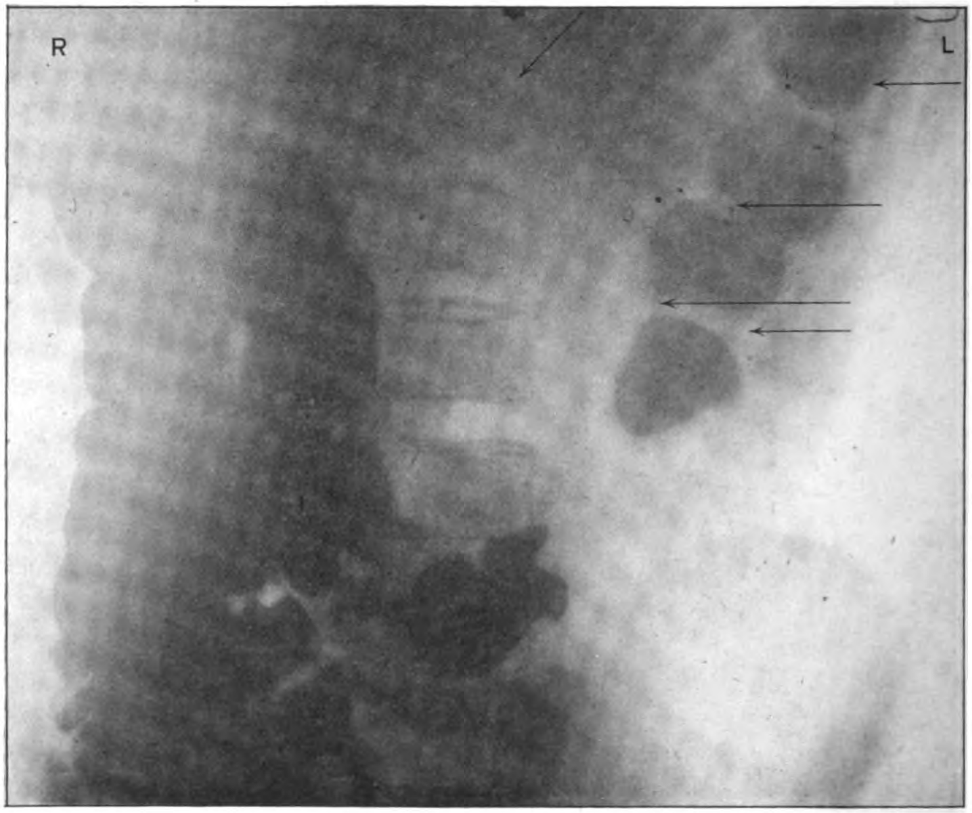


FIG. 9.

On November 1 a second radiogram (fig. 9) was taken and showed that the bismuth was still lying in the cæcum, ascending, transverse, and upper part of descending colons in spite of the paraffin. There were some shadows in transverse colon, splenic flexure, and upper part of descending colon which indicated ulcerative patches.

This patient is now doing very well.

CASE VI.

Trooper B., aged 29. Admitted into hospital as a case of enteric on October 4, 1915, after twelve days' illness, diarrhœa, and pyrexia, from A——. Twice he had been inoculated against enteric nine months ago. There were rose-coloured spots on abdomen; an undetermined spleen. He complained of a little tenderness over cæcum, but there was no rigidity. Temperature and pulse were normal on October 20, and patient doing well. On October 26 he was seized with abdominal pain, diarrhœa, and passed blood in his stools. Entamœbæ were found, and he was at once placed upon emetine, 1 gr. daily, and bismuth subnitrate in usual large doses. Patient complained of tenderness over sigmoid. Abdomen sunken, but no great wasting. Motions gradually reduced in number under this treatment.

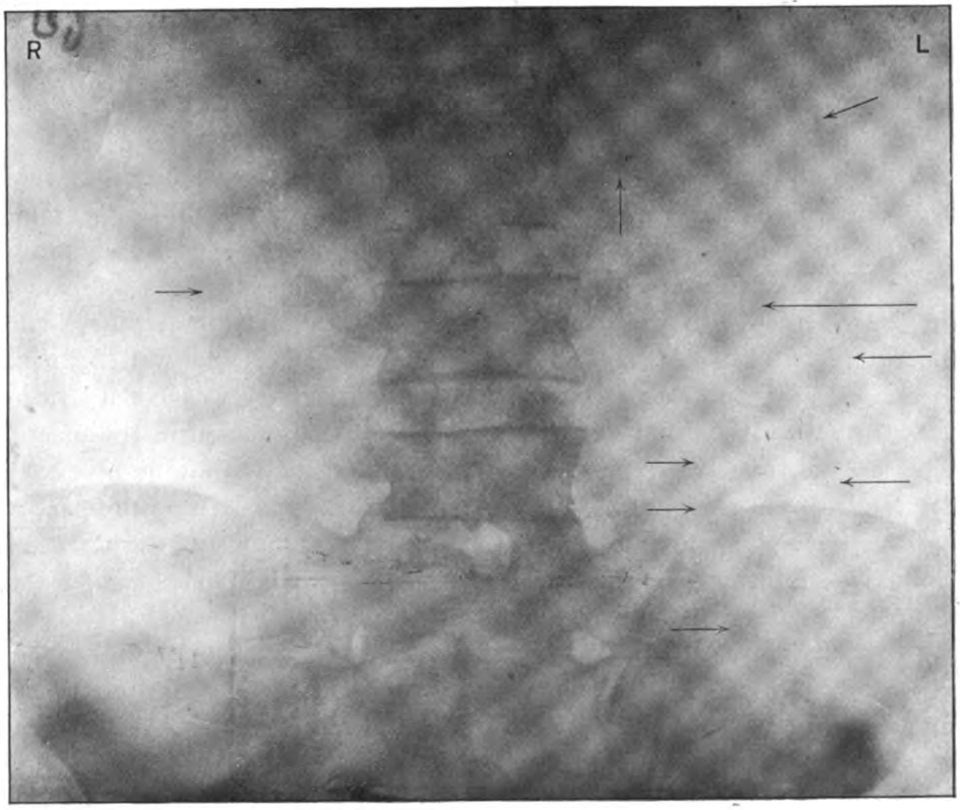


FIG. 10.

On November 1 a radiogram (fig. 10) was taken, but showed no collection of bismuth as in the other cases, but distinct shadows marked by arrows where ulceration might be, especially towards the lower end of descending colon into the sigmoid flexure.

This patient had had a very copious action just before being brought down for the X-ray examination, and this would account for the absence of any collection of bismuth in the large intestine. Patient is now doing well.

It was at the suggestion of Sir Ronald Ross and Lieutenant L. D. Shaw, M.D., R.A.M.C. (T.C.), that I undertook this work of showing, by means of radiograms, that it was quite possible to find the extent and position of ulcerative patches in cases of dysentery.

The radiograms are not so clear as I could have wished, but this is owing to the fact that I was unable to obtain a sufficiently high voltage, and consequently the exposures had to be long—each radiogram was given four minutes. This unfortunately allowed time for much movement of the bowels, and accounts for the shadows, where the ulcerative patches are, being blurred and not clear and well defined.

In two of the cases (second and sixth) diarrhœa was constant, so that the bismuth did not get much chance to deposit itself in the ulcers. The second case was one of constant diarrhœa with tenesmus, yet for all this the shadows given by the bismuth deposits are quite clear and distinct. This patient died, and at the post-mortem examination the oxide of bismuth was found to be lying in many parts, though the whole of the larger intestine was ulcerated all over.

In acute cases I do not think radiography will be of much assistance, but in chronic cases it will be of great assistance both to the physician and surgeon, as it will give a clear picture of areas where the ulcerative patches are situated.

Before a radiogram is taken the patient should be given bismuth subnitrate in 60 gr. doses every two hours during the day for at least six days. On the sixth day a radiogram should be taken, then the bismuth should be discontinued and liquid paraffin given in 2 dr. doses every two hours for twenty-four hours. Then a second radiogram should be taken, and this second one will show where any ulcerative patches may be situated.

I must thank Lieutenant Dudley Forde, M.D., R.A.M.C. (T.C.), for the notes of these cases, which were under his care in hospital, and also Sir Ronald Ross for his able assistance.

Medical Section.

President—Dr. A. E. Garrod, F.R.S.

Ulcero-membranous Stomatitis and Gingivitis among Troops: its Cause and Treatment.

(PRELIMINARY REPORT.)

By Frederick B. Bowman, M.B.Tor.[1]

(Taken as read: Communicated by Professor Sir William Osler, Bt., F.R.S.)

Since September 1 the number of cases of severe ulcerative conditions of the throat and mouth seen at Moore Barracks Pathological Laboratory would seem to warrant a report on their cause and treatment.

Many of these patients have come from the Shorncliffe area, where between 20,000 and 30,000 troops are stationed, and others have been in France and sent back here for treatment for various reasons. All cases of throat and mouth infection, before being admitted to the hospital, are examined at the laboratory, particularly to rule out diphtheria. The number of cases showing the presence of Vincent's organisms (spirochætes and fusiform bacilli) has been very striking. That nearly all cases with this infection showed severe gingivitis seemed remarkable, and for this reason since then from all cases coming to the laboratory with "pyorrhœa" and no evidence of a concomitant throat affection smears have been made from the gums, and, while occasionally the *Entamœba gingivalis* has been encountered in fair numbers, the most striking feature of this examination has been that in every case, without exception, Vincent's organisms have been present in large, not to say preponderating numbers, at times apparently in pure culture, and associated occasionally with amœbæ identical with those described by Bass as the specific cause of pyorrhœa alveolaris.

---

[1] Captain, C.A.M.C.; Pathologist to Moore Barracks, Canadian Military Hospital.

Those who have been returned from active service in France all state that the condition is very prevalent, and so serious that a great many men are not able to masticate properly, or in some cases to swallow without great discomfort.

The disease known as Vincent's angina was first described by F. Y. Clark [3] in 1879. He described an organism which, from his description as published by Miller [5] in 1884, must have been the organism of Vincent. Lingard and Batt [4] described the organism in cattle in 1883, and later in man. Plaut [6] published an article on the subject in 1894, and in 1896 Vincent [10] published a complete description of the condition, bacteriology, &c., and again in 1898 and 1905 [11] of the symptomatology and diagnosis. Many other articles have been published since, some of which will be referred to later.

The condition has been thought comparatively rare, and collections of cases have always been reported from institutions or places where there is more or less crowding. A search of the literature fails to show that any mention has been made of the occurrence of the disease among troops.

Rolleston [7] found only 0·5 per cent. of 18,000 cases admitted to the Metropolitan Asylums Board Hospital in London, during 1905 and 1907. Meyer, in the examination of 15,000 throat cases in Heymann's clinic in Berlin, found but thirty cases. Many authorities regard the disease as contagious. Chamberlain [1] reported a hand infection due to a bite by an infected person. Todd reports an infection in a pathologist who was exposed to the disease in an insane asylum. The use in common of drinking cups, tobacco pouches, dishes, &c., has been shown to have caused epidemics. In my own series, in one instance, several cases were traced to a dentist who had treated a severe gingivitis for pyorrhœa, and the same day treated three other men for some other reason, and these later contracted the disease and were shown by stained smears to be infected with Vincent's organisms. There apparently is no doubt about the contagiousness of the disease, and the close association of troops, either in camp or in the trenches, using the same utensils, would seem to favour its prevalence.

Vincent described two types of the disease: (1) diphtheroid, and (2) ulcero-membranous. In our series we have only seen the second type, and all have shown the presence of both the fusiform bacillus and the spirochæte. Sometimes in the same case one examination will show a preponderance of bacillus forms, and the next examination one of spirochætes. The severer the infection the greater is the abundance of these organisms.

The usual situation of the ulcer is in the tonsil, but it may involve the gums, tongue, mucous surface of the cheeks, the sublingual glands, parotid, and in children even the trachea may be affected. Chamberlain reports finding the organism in the lungs. A favourite situation in my series has been opposite the molar teeth. The ulcer itself tends to spread laterally, but in the tonsil may burrow deeply into the tissues. It is covered by a white friable membrane easily removed, leaving a bleeding surface beneath. The membrane is very different to that found in diphtheria, which is tough and usually comes away intact. The disease may be confused with syphilis, and Vincent's angina may be superimposed upon a syphilitic or diphtheritic infection of the mouth and throat. The Wassermann reaction has always been negative in the uncomplicated cases of Vincent's angina seen here.

In my series the temperature has been between normal and 102° F., never rising in any instance to 105° F. or 108° F., as described by Chambers and Wilson [2]. Generally the constitutional disturbance is well marked, and one of the most serious symptoms, severe depression, is always present, particularly in cases where the gums and teeth are affected. The breath is extremely fœtid, and patients complain of a very foul taste. Where the gums are involved they bleed easily, are injected, retracted from the teeth, and spongy-looking. Pus may be squeezed from the gum margins; sometimes the teeth are loose, and tender when tapped with a metallic instrument, sometimes so tender as to prevent mastication of anything but the softest of foods. There is always more or less glandular enlargement. The submaxillary and sublingual glands are most often affected. In one case I have seen the parotid enlarged.

Smears have been made from each case and examined, both fresh and stained. With a sterile swab a small portion of membrane or exudate is picked up and rubbed up in a little warm 0·85 per cent. saline on a slide and examined immediately with a dark ground illuminator, and also spread on slides for staining. In all instances both the spirochætes and the fusiform bacilli have been found motile.

All observers have noted this in examining the spirochæte, but some have described the fusiform bacillus as non-motile. The fusiform bacillus passes backward and forward with a tumbling motion, and not regularly, as do the flagellate bacilli—*Bacillus typhosus*, &c. The organisms have been grown anaerobically by Tunnicliff [9] on human, sheep, or goat's blood agar. They can be grown also with difficulty on Loeffler's blood serum. Other observers have also had some success (Nicolet and Marotte, Rhea).

We have had difficulty in studying the organism culturally, although we have been able to grow the bacillus anaerobically by McLeod's method in the following manner: Some of the exudate is picked up on a sterile swab and immediately rubbed up in a small amount of hydrocele or ascitic fluid. This is then inoculated into a tube of peptone broth with a small piece of sterile tissue (guinea-pig liver or kidney) in the bottom and having a perforated rubber stopper with a capillary tube passing out an inch or two. The tube is filled quite full of the media, and on pushing in the cork it rises into the capillary, which is immediately sealed off, giving a strictly anaerobic culture medium. Growth appears in a few days as a faint cloud above the sterile tissue in the tube, and usually there is a great preponderance of fusiform bacilli. There is a very foul odour given off from the media, very similar to that from the gums and ulcers in the mouths of patients. We have also grown the organism in starch ascitic agar by Rosenow's method. Any ordinary culture medium containing ascitic fluid or serum will afford growth under anaerobic conditions.

The clearest picture of the organisms is given by Giemsa's stain, and this I now employ as a routine method; but fresh smears stain well with methylene blue, and show the fusiform bacillus and spirochæte distinctly. The bacillus does not take a regular blue stain, but is usually barred, with an occasional granule deeply stained, situated anywhere in the organism. It is from $12\,\mu$ to $15\,\mu$ long, and varies in width from $1\,\mu$ to $5\,\mu$. The spirochæte is a very slender and delicate organism. The convolutions vary from five to twelve. The usual number is nine. No membrane can be seen. In stained smears it usually has no definite relation to the fusiform bacillus present in the same specimen, and is sometimes found in large bundles and sometimes singly. It is easily differentiated from the *Spirochæta dentium*, which has usually no more than five convolutions, or from the *Treponema pallidum*, which has between five and twenty-five and also stains very faintly and with difficulty. The *Spirochæta refringens* is much coarser and has broad curves.

Animal experiments have been quite unsuccessful, and the question of the identity of the two organisms has, therefore, remained undecided. However, we are inclined to support the view held by Tunnicliff and opposed by Vincent, that they are the same organisms, but that the bacillus is an earlier stage in its development. Wright and Mackie regard the organism as a protozoon, and, judging by the staining qualities, irregular undulatory motion, vacuolation, &c., we should be disposed to take this view also.

Many forms of treatment have been recommended. Trichlor-acetic acid, silver nitrate, iodine and peroxide of hydrogen, have all been used with some success, and salvarsan has also a marked effect on the condition, even when used as a mouth-wash. Arsenic, in some form, from its spirochætacidal effect, would seem to be an ideal application, but salvarsan, both from the standpoint of cost and instability of solution, prohibits its use among troops. The question of the possibility of the amœba causing the pyorrhœa or gingivitis (nearly always present in these cases) suggested ipecacuanha or its alkaloid, emetine, in the treatment of this condition, as recommended by Bass; for this reason the following prescription was prepared from drugs at hand in the hospital dispensary and has been used with marked effect:—

℞	Vinum ipecacuanhæ	... ...	½ oz.
	Glycerinum	... ...	1 dr.
	Liquoris arsenicalis	.. q.s. ad	1 oz.

Where the gums only are affected the solution should be carefully applied to the gums and pockets around the teeth by means of a small applicator. Where there is ulceration elsewhere in the mouth or throat the ulcer is thoroughly wiped out twice every day with the above solution, and all patients, whether the gums are infected or not, are instructed to put ten or fifteen drops on the tooth-brush twice a day and to brush the teeth and gums vigorously.

The following cases are illustrations of the types met with here, with results of treatment:—

Case I.—Lieutenant W. Seen on September 27, 1915. Complains of great depression. Cannot properly attend to his duties. Is wakeful at night and irritable, and has a general feeling of lassitude. The breath is very offensive. Physical examination shows nothing of importance. Patient is well nourished, but somewhat pale and sallow. Blood examination negative. Wassermann reaction negative. The teeth are loose, the gums red with irregular edges, and are retracted from the teeth. The slightest pressure on the gums causes them to bleed profusely, and small drops of pus appear at the edges. Examination of pus from teeth with dark field illumination shows numerous extremely motile fusiform bacilli and spirochætes. Stained smear shows numerous spirochætes and bacilli and a few streptococci, but no amœbæ. September 27: Advised treatment with the prescription recommended above; fifteen drops on tooth-brush twice a day. September 30: No odour from mouth; gums look healthy and clean; practically no pus; feels much better generally, no depression. October 4: Patient's gums appeared clean and healthy; teeth firm, no odour from mouth; smears negative for spirochætes or bacilli; streptococci present. This patient gave no history of sore throat and no evidence of throat infection could be found. The case was definitely one of gingivitis due to the organisms of Vincent.

Case II.—Private W. Has been ill for six weeks. Went to London, and culture was made for diphtheria. This was negative, and he was told that he had acute tonsillitis. There is a deep ulcer in the right tonsil, and in the left cheek a large shallow ulcerated area covered with a friable membrane. The teeth are bathed in pus, the gums red and bleeding, particularly around the last molars. There is marked enlargement of the right sublingual glands. Patient cannot open his mouth without difficulty. He is greatly depressed, and is unable to attend to his duties. Smears from around teeth and from ulcers show large masses of spirochætes and fusiform bacilli. Wassermann reaction negative. October 22: Thoroughly painted throat with ipecacuanha and arsenic mixture, and patient given some to use on tooth-brush. October 23: Patient feels better, ulcers are smaller, and the one in the cheek seems to be healing; mixture applied. October 25: Tonsil completely healed; ulcer in cheek much improved; glands reduced in size. October 27: Glands cannot be felt; ulcers healed; no odour from mouth; gums look healthy. Patient returned to duty and has not been seen by me since.

Case III.—Lieutenant B. Complains of having had tonsillitis for three weeks, complicated with tender gums which bleed easily, offensive breath, loss of appetite, and depression. Visited a dentist twelve weeks ago to be treated for pyorrhœa alveolaris, and his throat afterwards became sore and has been getting worse up to the present time. He cannot attend to his duties. At the present time (October 12) there is a deep ulcer just behind the anterior pillar of fauces on the left side; it is covered with a friable membrane easily removed, and bleeds easily. The gums are red and spongy-looking, particularly around the molar teeth. The teeth are in good condition, very little tartar present. The breath is very offensive; patient is greatly depressed. Smears from ulcer and from around teeth show a pure culture of Vincent's organisms. Dark field illumination shows the bacilli as well as the spirochætes actively motile. Ulcer and gums were treated with above prescription, and he was advised to brush his teeth with the mixture. October 13: Ulcer still present, but surrounding tissue is not nearly so injected and swollen; patient feels better; microscopical examination shows spirochætes preponderating. October 14: Ulcer greatly improved; no membrane present. October 15: Ulcer has practically disappeared, and patient feels and looks better; little depression; spirochætes present still. October 17: Gums look healthy; no odour present, and ulcer has disappeared. Patient advised to return daily for treatment, but did not return for seven days. October 24: Patient returned complaining of pain in inside of left cheek. Examination shows an ulcer behind the last left lower molar tooth. This extends up into the cheek and has a rather irregular outline, and is covered with a friable membrane which is easily removed, leaving a bleeding surface. Smears stained show a pure culture of Vincent's organisms. The ulcer in the tonsil has healed entirely, and the gums look much more healthy. Patient said he had given up using the prescription recommended because he thought he was cured. He was treated again twice, and ulcer again disappeared, but he has not returned, and I presume he has had no recurrence.

Case IV.—Corporal B. Has been complaining of tender gums and teeth for some time. Unable to masticate his food properly. Has been using a wash of peroxide which he states had no effect. Has had no sore throat. A month ago was receiving mercury treatment. Examination shows severe gingivitis, particularly around the last molar teeth, and a small superficial yellow-looking ulcer on anterior pillar of fauces, left side. Wassermann reaction negative. Microscopic examination shows numerous fusiform bacilli and spirochætes present. October 20: Ulcer treated with prescription recommended above, and patient was given some to use on his tooth-brush. October 21: Ulcer has disappeared. October 25: No gingivitis present, but a small punched-out ulcer has now appeared in the left tonsil; smears show Vincent's organisms. Treated with above prescription. October 26: Greatly improved. October 27: No spirochætes nor bacilli can be found; patient feels well, can masticate food, and has lost his depressed appearance. He has not returned.

Case V.—Private Q. Sent from dental department of Moore Barracks Hospital. Has had soreness of gums for some time. At the present time his teeth, particularly the incisors, are tender when tapped. The gums are retracted and spongy-looking. There is a very foul odour present. Patient is greatly depressed and discouraged. Says he does not care what happens to him. October 24: Fresh smears around the teeth show numerous amœbæ present, and motile spirochætes and fusiform bacilli; stained smears show numerous large amœbæ surrounded with spirochætes and fusiform bacilli; he was given the above prescription to use for his teeth, and advised to wash his mouth out afterwards with fifteen drops in half a glass of water. October 25: Gums look better and patient feels better. October 26: Tartar removed at dental clinic and mixture applied. November 1: Patient discharged perfectly well; gums healthy; teeth no longer tender; no amœbæ nor Vincent's organism can be found. No depression, and patient says he feels like a different man.

Case VI.—Sergeant-Major McM. Six months ago, when in France, noticed that his gums were sore and bled easily. This became worse until he said he could not attend to his duties. Had great depression, and for the past two months has been unable to eat any solid food. Has never complained of any sore throat. At the present time (December 22) he appears very dejected and discouraged. Examination of the mouth shows the gums red and spongy-looking. They are retracted from the teeth, particularly around the incisors. There is pus around all the gums and the breath is foul. The incisors are loose. Stained smears from pus show large numbers of Vincent's organisms present. No amœbæ can be seen. There are bacteria in large numbers also present. He states that in his battalion he knows of at least fifty men with the same trouble, thirty of whom are absolutely unfitted for duty by the severity of the infection. Some of them have lost their teeth. The infection has been so severe that the dental clinics refused to treat the men in some instances. December 22: Given tooth paste and mixture recommended above. December 23: All pus pockets and margins of gums thoroughly cleaned with mixture applied on a small cotton swab. December 24: Feels much better; gums appear cleaner, and there is no odour from the mouth. December 25: Greatly improved, very little pus present. December 26: Improvement. December 28: Gums look healthy, though still somewhat retracted; no Vincent's organisms can be found in stained smears; bacteria still present. Is able to masticate anything and can brush the teeth thoroughly without any pain and with very little bleeding. The teeth are firm.

Case VII.—Captain W. A. K. Complains of sore throat and bleeding gums. Tonsils were removed five months ago for "recurring septic tonsillitis." No culture or smears made at that time. Throat has been ulcerated and sore ever since. Six weeks ago noticed soreness of teeth and gums, and even before this time noticed that they bled easily. At the present time his pillow is blood-stained in the morning from the gums. Great depression and some anæmia are present. Examination shows right tonsil enlarged, and on the posterior aspect a large, deep, yellow-edged ulcer. The gums around all teeth are retracted and spongy-looking. The lower incisors are loose. The breath is fœtid. Smears from tonsillar ulcer show pure culture of Vincent's organisms, and smears from around the gums show the same predominating. November: Ulcer has no membrane and is healing rapidly; breath free from odour; patient says he feels like a different man.

Case VIII.—Private K. Has been treated several months for lesion on legs supposed to be syphilis, and for three months has had very tender, bleeding gums. About two weeks ago a large ulcer developed in mucous surface of the left cheek just opposite the molar teeth. At the present time he feels very depressed and is rather anæmic-looking, Breath is foul, and even on entering the room a distinct fœtid odour is present. The teeth are loose, gums receding and bleeding. Pus comes from beneath the gums on slightest pressure. Teeth are very tender. Opposite the molar teeth in the left cheek is a large ulcer about 2 in. in diameter. This is rather irregularly outlined with yellowish, necrotic-looking tissue, and covered with a greyish-white thick membrane. The ulcer and the gums are very tender. It appears very much like noma. Stained smear from ulcer shows masses of spirochætes and fusiform bacilli and many bacteria, streptococci, pneumococci, &c. November 6: Ulcer thoroughly cleaned with above prescription and patient given a paste containing both arsenic and ipecacuanha and told to brush the teeth and gums thoroughly twice a day. In two days the odour had entirely disappeared, the ulcer looked clean, and he felt and looked better. One week later the ulcer had completely healed, the gums were healthier-looking, and in one week more the patient was discharged.

Case IX.—Colonel V. Says he has had pyorrhœa alveolaris for months. Depression and lassitude present. Unable to concentrate his attention; has indigestion, and a general feeling of malaise. Has had dental treatment for months, with little result. October 25: Smears from pus around teeth show very numerous Vincent's organisms: I advised him to use the above prescription and have tartar removed; this was done and all small pockets of pus syringed with ipecacuanha and arsenic solution. November 1: Patient practically well and depression gone; digestion and appetite good; is able to masticate his food.

SUMMARY.

A very severe form of communicable mouth and throat infection is common among the Canadian troops in England, and from reports is also widespread among the British troops in France.

Clinically cases of this nature are diagnosed as syphilis, mercurial stomatitis, diphtheria, pyorrhœa alveolaris, &c., according to the form assumed. Apparently they are due to Vincent's organism (spirochætæ and fusiform bacilli). Although amœbæ, streptococci, &c., are also found present, it is only when Vincent's organisms have disappeared that the condition undergoes cure.

When the gums are attacked the disease is more acute than ordinary pyorrhœa, and in some instances the gums and mouth appear much the same as in scurvy.

The throat condition sometimes cannot be diagnosed clinically from syphilis, and in all suspicious cases a Wassermann reaction should be done before a definite diagnosis is made or treatment is begun. The therapeutic test is valueless, as one full dose of salvarsan will usually clear up a badly ulcerated throat due to Vincent's organism.

The disease may be coincident with any other throat infection.

It is sometimes chronic and may persist for months. A striking feature consists in the accompanying great depression and even vague constitutional disturbances, which utterly unfit the man as a fighting unit.

The infection in the gums is very persistent, but may be ameliorated, and is usually cured, by the use of a simple prescription composed of arsenic and ipecacuanha solutions. The throat even when deeply ulcerated may be healed in a short time with the same solution.

At the present time we are issuing from the dispensary of Moore Barracks Hospital a paste in small tins containing both Fowler's solution and ipecacuanha wine, which can be used in combination with the solution. Both paste tins and bottles of solution are marked "Poison," and the patient instructed to swallow as little as possible of the prescription while washing the teeth.

More than 100 cases have been studied to date, and every day new cases come into the laboratory for diagnosis, thus indicating that the condition is widespread and one worthy of investigation and attention.

REFERENCES.

[1] CHAMBERLAIN, W. P. *Philippine Journ. of Sci.* (B, Medical), 1911, vi, p. 489.

[2] CHAMBERS, M. B., and WILSON, HERBERT. "Remarks on Vincent's Angina," *Dominion Med. Monthly*, March, 1910.

[3] CLARK, F. Y. *Vide* Miller, "Micro-organisms of the Human Mouth," 1890.

[4] LINGARD and BATT. *Lancet*, 1883, i, p. 634.

[5] MILLER. "Zur Kenntniss der Bakterien in der Mundhöhle," *Deutsch. med. Wochenschr.*, 1884, i, p. 781.

[6] PLAUT, H. C. "Studien der bacteriellen Diagnostik der Diphtherie und der Anginen," *Deutsch. med. Wochenschr.*, 1894, xx, pp. 920-923.

[7] ROLLESTON, J. D. *Brit. Journ. Child. Dis.*, 1910, vii, p. 299.

[8] TUNNICLIFF, R. "Identity of Fusiform Bacilli and Spirilla," *Journ. Infect. Dis.*, 1906, iii, p. 148.

[9] *Idem.* *Journ. Infect. Dis.*, 1911, viii, pp. 316-321.

[10] VINCENT, H. "Sur l'étiologie et sur les lésions anatomo-pathologiques de la pourriture de l'hôpital" (angina with fusiform bacilli and description of his microbe), *Ann. de l'Inst. Pasteur*, 1896, x, p. 492; "Sur un forme particulière d'angine diphtheroïde (angine à bacilles fusiformes)," *Bull. et Mém. de la Soc. méd. des Hôp. de Par.*, 1898, xv, p. 244.

[11] *Idem.* "Symptomatologie et Diagnostic de l'Angine à Spirilles et Bacilles fusiformes (Angine de Vincent)," *Lancet*, 1905, i, p. 1260 (with full bibliography).

PROCEEDINGS

OF THE

ROYAL SOCIETY OF MEDICINE

EDITED BY

J. Y. W. MacALISTER

UNDER THE DIRECTION OF

THE EDITORIAL COMMITTEE

VOLUME THE NINTH

SESSION 1915-16

NEUROLOGICAL SECTION

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Neurological Section.

OFFICERS FOR THE SESSION 1915-16.

President—

JAMES TAYLOR, M.D.

Vice-Presidents—

W. D. HALLIBURTON, M.D., F.R.S.
R. PERCY SMITH, M.D.

Hon. Secretaries—

H. CAMPBELL THOMSON, M.D.
C. M. HINDS HOWELL, M.D.

Other Members of Council—

DONALD ARMOUR, F.R.C.S.
F. E. BATTEN, M.D.
E. BRAMWELL, M.B.
R. H. COLE, M.D.
T. R. ELLIOTT, M.D., F.R.S.
E. G. FEARNSIDES, M.D.
WILFRED HARRIS, M.D.
DAVID ORR, M.B.
H. R. PRENTICE, M.B.
W. T. HOLMES SPICER, F.R.C.S.
T. GRAINGER STEWART, M.D.
H. G. TURNEY, M.D.

Representative on Library Committee—

E. FARQUHAR BUZZARD, M.D.

Representative on Editorial Committee—

C. M. HINDS HOWELL, M.D.

NEUROLOGICAL SECTION.

CONTENTS.

October 28, 1915.

PAGE

Presidential Address: The Ophthalmological Observations of Hughlings Jackson and their Bearing on Nervous and other Diseases. By JAMES TAYLOR, M.D. 1

November 25, 1915.

Case of Neuritis. By JAMES TAYLOR, M.D. (In Dr. Taylor's absence shown by Dr. ADRIAN) 29

By C. M. HINDS HOWELL, M.D.

(1) Toxic Polyneuritis (Recurrent) of Motor Type 30

(2) Cerebral Tumour; Right Post-central, Subcortical 31

Gunshot Wound of the Lumbar Spine; Injury to the Cauda Equina; Destruction of the Pelvic Autonomic Nerves; Paralysis of the Large Intestine and Rectum; Recurrent Attacks of "Intestinal Obstruction." By E. G. FEARNSIDES, M.D. 32

Division of Right Antero-lateral Tract of the Cord for Relief of Pain in Tabetic Crises. By H. S. SOUTTAR, F.R.C.S. 38

Paralysis of the Sympathetic (Birth Injury) with Hetrachroma Iridis. By M. S. MAYOU, F.R.C.S. 43

(?) Syringomyelia and Syringobulbia with Sudden Disappearance of Sensory Symptoms. By C. M. HINDS HOWELL, M.D. 44

Intermittent Tonic Spasm affecting chiefly the Lower Extremities, Progressive in Character, arising subsequent to an Attack of Measles. By T. GRAINGER STEWART, M.D. 45

February 24, 1916.

PAGE

Cases shown by Dr. JAMES TAYLOR. (1) Syringomyelia, (2) Myasthenia Gravis, (3) Monoplegia 47

Cases shown by E. G. FEARNSIDES, M.D.
  (1) Myasthenia Gravis and Epileptiform Attacks observed over a Period of Eleven Years 47
  (2) Hypopituitarism, Dystrophia Adiposo-genitalis, Polyuria and Polydipsia; Bilateral Cortico-spinal Interference; Optic Neuritis and Ptosis on Left Side; No Changes in Sella Turcica; Positive Wassermann Reaction in Serum 50
  (3) Case for Diagnosis 55

? Cerebral Tumour. By HUGH THURSFIELD, M.D. 56

Cases shown by Dr. COLLIER. (1) Jargon-Aphasia, (2) Tremor resembling Paralysis 57

Spastic Paralysis in a Boy, aged 8. By C. M. HINDS HOWELL, M.D. 57

March 30, 1916.

By JAMES TAYLOR, M.D.
  (1) Case for Diagnosis 59
  (2) Case for Diagnosis 60

Case of Hysteria. By J. S. RISIEN RUSSELL, M.D. 60

Median Nerve Injury; Causalgia; Alcohol Injections. By LEWIS R. YEALLAND. (Introduced by W. A. TURNER, M.D.) 61

By F. E. BATTEN, M.D.
  (1) Case of Muscular Atrophy 62
  (2) Case of Muscular Atrophy 62
  (3) Paraplegia following Cerebrospinal Meningitis; Laminectomy ... 63
  (4) Case of Ataxia in a Child 63

By S. A. K. WILSON, M.D.
  (1) Case for Diagnosis; Syringomyelia or Disseminated Sclerosis (?) ... 64
  (2) Lesion of Right Optic Thalamus and Regio Subthalamica 65

May 25, 1916.

Two Cases of Post-central Injury of Cortex, shown for the purpose of eliciting evidence on—(i) the Appreciation of Vibration, (ii) Recovery, (iii) Segmental Representation on the Cortex. By F. E. BATTEN, M.D. 67

The "Pudding Face" Type of Dyspituitarism (?). By E. G. FEARNSIDES, M.D. 69

Amyotrophic Lateral Sclerosis in a Man, aged 28, showing Chvostek's Sign. By LEONARD GUTHRIE, M.D., and E. G. FEARNSIDES, M.D. 71

PAGE

Sclerodermia with Subcutaneous Calcareous Concretions. By E. G. FEARNSIDES, M.D. 73

Bilateral Ptosis and Ophthalmoplegia Externa, with other Symptoms, for Diagnosis. By F. S. PALMER, M.D. 77

By P. HAMILL, M.D.

(1) Case of Gummatous Meningitis 80

(2) Case of Muscular Dystrophy 81

Case of (?) Syringomyelia. By JAMES TAYLOR, M.D. 81

Case shown for Diagnosis at a previous Meeting. By HUGH THURSFIELD, M.D. 82

Neoplasm of the Lumbar Region of the Spinal Cord. By H. CAMPBELL THOMSON, M.D. 83

Case for Diagnosis. By J. S. RISIEN RUSSELL, M.D. 86

SECTIONS OF PSYCHIATRY AND NEUROLOGY.

(COMBINED MEETING.)

January 25, 1916.

SPECIAL DISCUSSION ON SHELL SHOCK WITHOUT VISIBLE SIGNS OF INJURY.

PAGE

Opened by Major F. W. MOTT, R.A.M.C., M.D., F.R.S. i

Major W. McDOUGALL, R.A.M.C. (p. xxv) — Captain WILLIAM BROWN, R.A.M.C. (p. xxvii) — Dr. STANSFIELD (p. xxx).

January 27, 1916.

Special Discussion on Shell Shock without Visible Signs of Injury (*continued*) :—

Captain WILFRED HARRIS, R.A.M.C. (p. xxxiii)—Dr. COLLIER (p. xxxiv)—Mr. WALTER H. JESSOP (p. xxxvi)—Dr. CAMPBELL THOMSON (p. xxxvi)—Dr. DUNDAS GRANT (p. xxxvii)—Dr. FEARNSIDES (p. xxxix)—Dr. LEONARD GUTHRIE (p. xli)—Major MOTT, R.A.M.C. (reply) (p. xli).

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

LONDON:
JOHN BALE, SONS AND DANIELSSON, LTD.,
OXFORD HOUSE,
GREAT TITCHFIELD STREET, OXFORD STREET, W.

Neurological Section.

President—Dr. JAMES TAYLOR.

(*October* 28, 1915.)

PRESIDENTIAL ADDRESS.

The Ophthalmological Observations of Hughlings Jackson and their Bearing on Nervous and other Diseases.

GENTLEMEN,—Let me first in one word thank you for the great honour you have done me in electing me to what I consider the highest position to which one who has worked at neurology may aspire. It is not easy for anyone to wear with grace and distinction the "giant's robe" which the President of this Section must necessarily assume —for my predecessors have all been eminent, and not a few of them great—but such a robe may serve to hide defects and deformities, and at least I shall hope to do nothing unworthy of it, and to hand it over intact and untarnished to a more worthy wearer.

I do not think it can be easy for anyone who was not brought intimately in contact with him, to understand the feelings of reverent affection which all of the younger generation who had enjoyed that good fortune always entertained for the great personality of Hughlings Jackson. It may seem presumptuous in me to choose such a subject for my address as that which has been announced, but I should urge that I am not about to criticize, and what I have to say will be more in the manner of an attempt to appreciate some of his work. Anything approaching an account and estimate of all his work is much more than I can attempt in the form of a short address, but I trust that what I shall say may have the effect of stimulating interest in his writings so that their wonderful wealth of clinical observation, their accurate scientific method and their broad philosophical grasp may be better and more generally recognized than they have been as yet.

Jackson's writings are best considered in groups. One of his earliest and most lasting interests was undoubtedly in connexion with ophthalmological and ocular conditions. He was clinical assistant at Moorfields Hospital for several years. These ophthalmological interests were, of course, intimately bound up with his interest in the symptomatology of intracranial tumours, and most of his early writings have reference to these subjects. Speech and the alteration of that faculty by disease naturally appealed to his philosophical mind, and I feel sure that all neurologists feel indebted to Dr. Henry Head for the work he has done in placing Jackson's position in reference to this important subject clearly before neurologists. Another division of Jackson's work had reference to paralysis, hemiplegia, chorea, and the syphilitic diseases of the nervous system. Still another—intimately associated with the last—dealt with epilepsy in its varied phases, another with vertigo and associated ear conditions. His work on the evolution and dissolution of the nervous system was really a series of philosophical treatises, and his suggestions with reference to the study of disease of the nervous system were severely scientific and yet intensely practical. Among the most interesting of his papers are those designated "neurological fragments," and they are, as their name implies, fragments of what one might call intensive neurological investigation and teaching, dealing with an exceedingly varied class of subjects.

I need hardly say that this division of subjects is not Dr. Jackson's. It is one for which I am entirely responsible, and, as you can understand, one division may overlap another, and many papers find a natural place in more than one of the divisions. But it is convenient to divide his writings in this way so long as we regard the divisions merely as a convenient series of pigeon-holes, and to-night I propose to consider the division which has reference to ophthalmological subjects. This, as will be evident from what I have said, must naturally lead me to refer occasionally to writings which more particularly deal with the symptomatology of intracranial tumours.

The invention of the ophthalmoscope marks an epoch in medicine. It is nearly always associated with the great name of Helmholtz, but it should be remembered that four years before Helmholtz described his instrument the ophthalmoscope had really been invented by Babbage, and was only laid aside because an ophthalmic surgeon to whom he showed it failed to discern its possible usefulness and gave him no encouragement. It is interesting to know that the modification of Helmholtz's instrument soon approximated to the form originally invented by Babbage, and it is this form of instrument, with, of course, modifications and improvements, which is now in general use. Dr. Jackson's friendship and early association with Mr. (afterwards Sir) Jonathan Hutchinson—they were both Yorkshiremen, both apprenticed in York, and both held resident posts (not simultaneously) in that city—was no doubt the cause of his becoming early acquainted with Moorfields Eye Hospital, and his work there gave an extraordinary stimulus to his interest in ocular and ophthalmological conditions. He has said that he considered it "the luckiest thing in his medical life" that he began the scientific study of his profession at an ophthalmic hospital.[1] Many of his earliest writings, the result of observation at Moorfields, are published in the Moorfields Hospital reports, and are mostly concerned with ophthalmoscopic observations. But these observations had almost always reference to the association of ophthalmoscopic changes with medical disease—especially disease of the nervous system—and he was never tired of insisting upon the necessity of routine ophthalmoscopic examination in all such disease. In an early paper he says[2]:—

> "My object in writing this article is simply that I may contribute from my own field of clinical work a few observations on a class of symptoms, the meaning of which it is most desirable to make out for the sake of advancing our knowledge of diseases of the nervous system. This renders it necessary that I should address myself both to the ophthalmologist and to the general physician, and thus I run a double risk of criticism. If in the slightest degree I do something towards bridging over the special and perhaps somewhat isolated department of ophthalmic medicine with the more general one, I shall have done all I wish to do."

The paper to which this is a preface is devoted to a study of defects of sight in brain disease. In this, attention is directed to several interesting points. The occurrence of the two kinds of atrophy—one in which the nerve gradually whitens, the other in which it becomes white after certain acute changes—is mentioned, causing what was then called "amaurosis." The difficulty is mentioned of following up and carefully observing such cases, because of their tendency to go from one hospital to another according to the nature of the symptoms. The sudden failure of sight which occurs in some cases of cerebral disease is referred to. Incidentally he alludes to a danger with which most of us are probably familiar, viz., that an ophthalmological examination or even treatment is sometimes blamed for loss of sight. Thus one patient ascribed his loss of sight to a blister which had been applied, another to the use of galvanism, and a third became blind soon after an ophthalmoscopic examination, and ascribed the loss of vision to the examination. In the same paper attention is directed to the headache and vomiting which occur with intracranial tumours, and the danger of mistaking this condition for gastric disease. Further the importance and usefulness of ophthalmoscopic examination in cases of hemiplegia, especially for evidence of Bright's disease, and in cases brought in comatose, is insisted upon.

---

[1] *Brit. Med. Journ.*, 1877, i, p. 575.

[2] *Roy. Lond. Ophth. Hosp. Reports*, 1863-65, iv, p. 390.

The interest of these early papers of Dr. Jackson's is of two kinds: they embody records of observations of phenomena which were then novel, and the significance of these is set out with a clearness and completeness which left little for subsequent observers to do. But they also contain reflections and remarks which make one feel that the work as a whole is pervaded by a philosophical spirit which breathes life into the dead bones of mere clinical observations. Thus at the beginning of one of the sections of this paper he apologizes for speaking too much of some symptoms which are out of the scope of a journal of ophthalmology[1]:—

> "Much of the interest, however," he says, "depends upon the number of symptoms which can be put together in an intelligent order. Amaurosis may be studied at once with too much intensity and too little breadth. It is to the ophthalmologist a disease of so great importance, calling for particular action on his part, that he may underrate its significance as a symptom in general conditions of the system. But it is when it occurs with other phenomena that we are most likely to discover what optic neuritis means."

He then goes on to say that his object in writing is to urge physicians and ophthalmic surgeons to do more work together. Thus if amaurosis and defect of speech are found in the same patient, both the symptoms must be studied by one person. The ophthalmic surgeon can scarcely confine his thoughts to a single sense apparatus, however much his practice may be limited to the defects of that one. To the physician defect of smell, although it may be less important, is of equal significance with defect of sight. Hemiplegia with its allies is the extra-ophthalmological symptom which chiefly deserves the consideration of ophthalmologists because of the frequent ocular or visual anomalies associated with it.

---

[1] *Roy. Lond. Ophth. Hosp. Reports*, 1865-66, v, p. 257.

" Odd as it may at first sight seem," he goes on to say, " I feel more and more convinced that there are important reasons why ophthalmologists and those physicians practising in insanity should do much work in common. Not because defects of sight are particularly associated with mental symptoms, nor because insane people may be liable to defects of sight, but because the special study of the evolution of movement (and sensation) is, I think, best begun at Ophthalmic Hospitals. And so far us we can know anything definite of mind, it is, I suppose, made up of sensory and motor phenomena—the functions of a series of anatomical possibilities in the cerebrum in correspondence with its wide environment, as well as in the spinal cord with its narrow environment. . . . Now nowhere could we better begin to study intelligent movements of muscles than at Ophthalmic Hospitals. . . . The study of the higher movements, as for words, will, I feel sure, derive great help from the laws of muscular motion which ophthalmologists have been or will be able to establish in their own department of medical practice."

He then outlines a method of medical work :—

" Were I free," he says, " to work in this metropolis at the Physiology of Movement, from gross muscular movements towards thought, in the way I should prefer—supposing, to begin with, an ordinary general medical and scientific knowledge—I should study first in the wards and in the out-patient room of a General Hospital such symptoms as Hemiplegia, Chorea, and Epilepsy ; next, at an Ophthalmic Hospital, Paralysis of the Cranial nerves and defects of Sight ; next at a Special Hospital for such symptoms as those of Locomotor Ataxy and certain Epileptiform Seizures ; then at an Orthopædic Hospital for Infantile Paralysis and for so-called Contractures. Now I would study specially deviations from healthy movements of the eyeballs and the rudimentary delusional effects they cause. I would, after this work, return to the General Hospital, to study defects of Speech, Delirium, Apoplexy, Coma, etc. Varieties of defects of Speech I should compare and contrast from difficulty of articulation to incoherence. At this juncture a careful study of laryngeal and throat diseases would be most desirable.

" Of course if anyone were to work at different sections of medical practice, so as merely to add isolated series of facts to one another, he would really make little progress in cultivating his own mind. Such a man would dwell with exaggeration—hurtful to his own organization of medical knowledge—on amaurosis as a defect of sight, and too little on it as a defect of a highly specialized part of universal sensation. He would not improbably neglect altogether such symptoms as defects of smell, which defects, however, are really quite as significant incidents in the revelations which disease makes of function as defects of sight are. Such a student would be altogether unprepared for the last and the very highest medical study, viz., of Insanity. Special work at diseases of the mind should, I feel convinced, be begun only after a large real experience of all the special phenomena of motion and sensation that damage to any parts of the Nervous System does or may give rise to. I say a real experience, as I suppose a collection of numberless facts, however accurately gathered, is not held to be of itself a real experience. Unless a man can put the particular phenomena he himself sees under more general laws, or unless he tries to do this, he can scarcely be said to know or to be studying a thing in any very valuable sense. The knowledge the ophthalmologist has of muscular disorders of the eye, the knowledge the physician has of defects of articulation, of Chorea, and of epilepsy, and that the psychologist has of incoherence and delusions should aim to be Physiological Units, each different but each related to a wide common knowledge of such Laws—present or in progress—as those of the Evolution of Sensation and Movement in Organisms."

In 1863 Wordsworth[1] had drawn attention to one particular form of amaurosis occurring in tobacco smokers, and Jackson[2] took the opportunity, in considering this, of raising the question of the rôle of sex in disease, especially in disease of the nervous system, and of offering suggestions for its investigation. Wordsworth had noted the much greater frequency of optic atrophy in men than in women. Hutchinson from a large mass of material had made the same observation. This, as Jackson says, while pointing to some greater liability in the male to optic atrophy, it would be unreasonable to ascribe to tobacco smoking until more positive and negative evidence had been obtained. He suggested, however, widening the inquiry as to the influence of sex in disease by considering two other diseases—progressive locomotor ataxy and general paralysis of the insane, both of which are diseases of the nervous system rarely found in women.

"The widening of the subject," he said, "need not confuse the inquiry by making it more complex: for, on a scale sufficiently broad to avoid error, especially the error of attaching too much importance to accidental circumstances—amaurosis can only be studied by an ophthalmologist, progressive locomotor ataxy by those practising generally, and general paralysis by physicians to large asylums. Although, then, there would be more work there would be more workers; and yet when working singly the workers would have a bond in variety of purpose, as their ultimate object would be the same. For although the diseases of the nervous system to be investigated are widely different as groups of physiological symptoms, the pathological question, or at least the most important part of it, is as to the effect of tobacco smoking and other sexual habits, peculiarities, or vices, in leading directly or indirectly to degeneration of the elements of a certain tissue—the nervous."[1]

---

[1] *Lancet*, 1863, ii, p. 95.

[2] *Med. Times and Gaz.*, 1866, ii. p. 819.

I mention this paper and its suggestions as indicating how widely awake Jackson's mind was to the bearing of recognized ophthalmological conditions on the etiology of nervous disease generally.

Jackson had written as early as 1863[2] on the existence of optic neuritis without obvious defect of sight, and had frequently repeated this observation. Hutchinson[3] had drawn attention in 1867 to Jackson's observations, for apparently they had been ignored and even doubted, and Jackson[4] writes that Clifford Allbutt's experience confirms his observations. He goes on to say with quite characteristic modesty:—

> "So far as the observer is concerned the discovery is a very small matter. Any physician who will use the ophthalmoscope by routine must quickly discover the fact. Yet the obvious deduction is really a very important one in practice. This is embodied in the following quotation—italicized in the original—from a paper which I published in 1863: '*It is, I submit, imperative, in all cases of severe cerebral disease, at all events in cases of an acute kind, to examine the eyes with the ophthalmoscope, whether the patient complains of defect of sight or not.*'
>
> "I should now make the statement much stronger by adding '*even if he affirms that he can see well, and if he read small type readily.*'
>
> "I have occasionally had the somewhat painful feeling that the accuracy of my ophthalmoscopic examination has been doubted by Physicians whose opinion I highly value, when I have declared that patients with severe cerebral disease, who seemed to see quite well, had inflamed optic discs."[5]

This point Jackson had to insist upon many times before it was accepted, and we are apt to forget that what to us is now commonplace required such reiteration and insistence.

A question which was frequently discussed at this time was, Does disease of the cerebellum lead to loss of sight? Brown-Séquard had stated that it was certainly often associated with this, and he expressed the opinion that it was the result of reflex action from some irritant.

---

[1] *Med. Times and Gaz.*, 1866, ii, p. 219.

[2] *Roy. Lond. Ophth. Hosp. Reports*, 1863-65, iv.

[3] *Med. Times and Gaz.*, 1867, ii, p. 670.

[4] *Med. Times and Gaz.*, 1868, i, p. 143.

[5] *Roy. Lond. Ophth. Hosp. Reports*, 1863-65, iv, p. 403.

Jackson[1] discusses the question, and clearly expresses the opinion that disease of the cerebellum *per se* does not produce blindness any more than does disease of the cerebrum, but that tumour in either region may, and often does, by setting up optic neuritis—"the result of a local encephalitis."

> "Whilst destruction of no part of the cerebrum or cerebellum leads to loss, nor even to defect of sight, irritation by tumour in any part of either may lead to inflammation of the optic nerves, on which inflammation, blindness usually, —not always—follows."

At this stage, in 1871,[2] Jackson published a lecture on optic neuritis in intracranial disease, in which he sums up in a succinct form much of what he had been teaching for several years. He points out the value of the ophthalmoscope in diagnosis: that morbid ophthalmoscopic signs are rarely absent in amaurosis from cerebral disease, that optic neuritis is the commonest ophthalmological condition in cases of cerebral disease, and is as important in the diagnosis of cerebral disease as in hemiplegia. He then describes the stages of optic neuritis—the onset, the second stage with great swelling, the third in which atrophy is commencing, and the fourth, that of permanent atrophy. He also again, what he earlier insisted upon, points out that in some cases of optic neuritis there is no defect of sight, that optic neuritis is almost invariably double, and that paroxysmal failure of sight occurs in cases of optic neuritis. Occasionally, also, it is pointed out there is rapid and permanent failure of sight. With reference to the nature of the intracranial disease most often associated with double optic neuritis he makes two statements: (1) There is usually a gross change, or "coarse" disease—a lump of something—an adventitious product; (2) double optic neuritis does not point to any particular *kind* of coarse disease, but simply to coarse disease of *some* kind. There are certain conditions under which double optic neuritis scarcely ever occurs—e.g., chronic and general convulsive attacks, a condition of hemiplegia from local softening, &c.—and he points out that optic neuritis is not a localizing sign, and then discusses the different theories as to the manner in which an adventitious product in the cerebrum leads to optic neuritis. He concludes by begging his readers to remember three things:—

(1) That optic neuritis frequently exists when the patient can read the smallest type.

---

[1] *Brit. Med. Journ.*, 1870, ii, p. 459.

[2] *Med. Times and Gaz.*, 1871, ii, p. 241.

(2) That the ophthalmoscopic appearances vary extremely in degree in cases of adventitious products within the cranium, and that the appearances vary much at different stages in the same case.

(3) That one should never omit to use the ophthalmoscope when a patient has severe and continued headache.

During the next few years Dr. Jackson continued his ophthalmological contributions from time to time. His "Physician's Notes on Ophthalmology"[1] are a storehouse of interesting records of many cases carefully and systematically observed, and of even more valuable suggestions. He also published[2] anomalous cases—one of large cerebral tumour *without* optic neuritis, another[3] of double optic neuritis without cerebral tumour, and he also[4] recorded a case of *recovery* from double optic neuritis. It is clear, as will be seen, that he recognized the curious variability in the incidence of ophthalmological signs of severe cerebral disease and that—

(1) Intracranial tumour may be present without optic neuritis.

(2) Optic neuritis may be present and yet no tumour be found.

(3) Optic neuritis does not necessarily result in blindness, although there is usually great danger of its leading to impairment of sight, and yet that occasionally it passes off without causing any impairment of vision.

The Annual Oration to the Medical Society of London, which he delivered in 1877, is perhaps one of the most characteristic of Jackson's addresses. It is an interesting combination of that scientific knowledge, clinical observation and philosophical suggestion to which reference has already been made. It sums up in a very clear way much of what Jackson had been engaged in teaching for many years, and more especially it dwells upon the work of the ophthalmic surgeon as a training in discipline and surgical skill, and as affording opportunity for observation in ocular palsies and their effects, in the anomalies of refraction, of the actual state of a nerve and its termination, and of the conditions of the blood-vessels and the retina generally. He emphasizes the importance of recognizing the effects which refractive errors may produce. Thus astigmatism may produce "confusion of vision" because of the difference in the distinctness in different meridians: hypermetropia may cause, and has actually caused, symptoms simulating those of brain disease such as headache and squinting, and observation of hypermetropic disks is of the utmost importance because of the close resemblance they bear to the inflamed disk associated with intracranial tumour. The phenomena of what was then called diphtherial amaurosis as they are revealed to the ophthalmic surgeon are also dealt with, and their relationship to affection of the ganglia is pointed out, and the interesting question is raised whether in diphtheria there is, as affecting hearing, something analogous to paralysis of accommodation in the eye.

---

[1] *Roy. Lond. Ophth. Hosp. Reports*, 1873 and 1874, vii and viii.

[2] *Roy. Lond. Ophth. Hosp. Reports*, 1874, viii, pp. 434-435.

[3] *Roy. Lond. Ophth. Hosp. Reports*, 1874, viii, pp. 445-446.

[4] *West Riding Asylum Reports*, 1874, iv, p. 24.

The study of paralysis of the ocular muscles is dealt with. This naturally leads to a consideration of vertigo generally and also of defects of co-ordination. The vertigo which occurs from paralysis of an ocular muscle is not, it is pointed out, the result of diplopia but of erroneous projection. A patient suffering from paralysis of the right external rectus, if the left eye is covered and he is asked to touch an object placed to the right of the middle line, will miss the object, his hand going to the right of it. That is, the patient judges by the activity of the centre for movement, "the hand is *misinformed*," to speak metaphorically, or, to use an incoherent simile, "makes a false step." It is not difficult to see the analogy between such an action and actual reeling. During walking there will be many actual false steps due to the misleading information which the centre for the impossible movement of the eye supplies. It is inaccurate to say that vertigo causes disorder of co-ordination. The only difference between vertigo *without* outward manifestation and vertigo *with* the outward manifestation of a "reel" is one of degree. In the former there are slight central changes and in the other strong central changes leading to peripheral effects. There is thus an analogy between those two conditions, or rather degrees, of vertigo and the two conditions of speech—speaking internally and speaking articulately.

He then proceeds to draw a distinction between sensation and the physical process occurring along with it:—

> "The use of the word sensation both for a state of consciousness and for a state of the nervous centres produces the same kind of confusion as the use of the expression that the sun rises in the east would do in an exposition of the movements of the solar system!
>
> "The facts of ocular vertigo with other allied facts from other departments of medical practice throw light on psychico-physical operations. Speaking generally, they help to show that ideas arise, not only during energizing of

sensory centres, which everybody admits, but during energizing of motor centres, which scarcely anybody seems inclined to believe. We have seen that the patient judges of the positions of objects by central discharges which do not actually displace his retinal images. Now the extension of an object is really made up of relations of innumerable positions. To give a particular illustration, the facts of ocular vertigo are of inestimable value in supporting the doctrine that the anatomical substratum of a word is a motor, an articulatory process."

Another aspect of the matter is next considered, viz., that in some cases of paralysis of ocular muscles the size of the object is altered. The fact is referred to that if we impress the retina with a scarlet object the after-image will be altered in size with accommodative efforts. There is in this phenomenon, of course, a motor change only, for the retinal area affected is unaltered. The shape of objects also, it is pointed out, can be altered in some degree. Thus if we obtain the after-image of a circle and project this on to an inclined sheet of paper the spectral circle becomes oval. The case is also mentioned of a medical man subject to migraine who observed that he could alter by accommodative efforts the size of the visual spectra which preceded his headache. And in some cases of epilepsy there is a warning in the alteration of the size of objects: mostly they get bigger and nearer, "the walls of the room seemed to come nearer," as one patient expressed it. All these cases, except probably that of epilepsy, it is claimed, show that estimation of the size of objects depends upon activity of a motor element only. And the fact that in paralysis of the ciliary muscle by atropine or by disease objects appear smaller, shows that activity of motor centres may cause alteration in the size of an object when actual movement is impossible.

"These facts," he goes on to say, "like those given in speaking of vertigo," show plainly, I think, the inseparable connexion of motor activity with sensory activity in ideation. They show that, whilst the colour—the secondary or dynamical quality—of an object is a sensory affair, its size and shape, its primary or statical quality, is a motor affair. If so, then ophthalmological facts are of inestimable value not only as bearing on an important psychological problem, but as bearing on the most important of all questions whatever in psychology; they demonstrate that the estimation of the extension of objects is due to motor activity; and they show that activity of motor centres will suffice; and thus they lend support to the doctrine that, in remembering the shape of an object there is slight activity of central motor centres just as much as there is slight activity of sensory centres in remembering its colour."

Similarly, in reference to locomotor ataxy, he argues against the hypothesis of a "special co-ordinating centre." He explains the ataxy by supposing that the current developed does not, on account of diseased tracts, react with full effect on the muscle most concerned with accurate locomotion—the peroneus longus—but overflows into the tibialis anticus and so produces in it over-action, really the same result as what is called "secondary deviation" in certain conditions of ocular paralysis. "There is, in short, over-estimation of the intended but underdone peroneal movement, and actual overdoing of the tibialis anticus movement."

An analogous condition had been pointed out by Duchenne in the case of a hand wasted in regard to its flexors. When such flexors are atrophied and a strong attempt is made to close the fingers, the actual effect is over-extension of the fingers, the current intended for the paralysed flexors actually overflowing into the extensors.

With reference to sensory affection of the eyes, it is pointed out that hemiopia is a sensory symptom which is the strict analogue of the motor symptom lateral deviation of the eyes, and it is frequently associated with hemianæsthesia. Sight sensations, it is pointed out, are more frequently precursors of epileptic attacks than any other special sense warnings except touch. Smell is next, but auditory warning is rare. That sight should be the most frequent is what one would expect, for most ideation is carried on in visual ideas. A patient may have sight sensations, e.g., coloured vision, long before he has epileptic attacks ushered in by such sight sensations.

He then proceeds to refer to the use of the ophthalmoscope, pointing out its importance, for in case of defective vision, associated with intracranial disease, there is nearly always change visible with the ophthalmoscope. Yet it is very important not to make too much of slight changes. Imperfect observation may detect "congestion" and "anæmia" of the disk when physiological redness and pallor are the true conditions. "Some observers," he says, "are really inferring when they should be only looking." He also pointed out that those who do not use the ophthalmoscope are apt to miss important changes, and perhaps to misinterpret symptoms. It must be remembered that it is exceedingly common for a patient with intense optic neuritis to see quite well, and if such a patient died and a cerebral tumour were found, unless an ophthalmoscopic examination had been made the presence of inflamed disks would have been undiscovered and the significance of such a condition missed. An illustration of the converse of this was the case of a patient who became almost blind and died. Post mortem, a condition of disease of the optic thalamus was discovered. In such a case the blindness might have been ascribed to the disease in the optic thalamus—quite erroneously—had it not been discovered by the ophthalmoscope that in each retina there were the extensive changes of albuminuric retinitis.

Optic atrophy also, it is pointed out, is important in reference to examination with the ophthalmoscope. It often occurs in tabes dorsalis and in general paralysis of the insane. It may occur with or without pupil changes, with or without pain, with or without ataxy. And, of course, it is not a necessary sign in tabes dorsalis.

Another condition noted with the ophthalmoscope is retinal embolism. This may be associated with evidence of cerebral embolism, and observation with the ophthalmoscope is important, as otherwise the optic atrophy, the result of embolism of the central artery of the retina, might be mistakenly supposed to be the result of cerebral disease. Similarly also, it is pointed out, the ophthalmoscope may render visible other tissue changes in the fundus, such as those resulting from tubercle and syphilis and from Bright's disease. But it has to be noted that the ophthalmoscopic appearances of Bright's disease are often closely simulated by those occurring in intracranial tumour, while conditions really depending upon Bright's disease are often such as strongly to suggest the condition of the fundus occurring with intracranial tumour. Reference also was made to the visible arterial pulse in the fundus found in association with aortic regurgitation, and to the retinal hæmorrhages occurring in some cases of purpura.

In the paper,[1] "Remarks on the Routine Use of the Ophthalmoscope in Cerebral Disease," he returns to a subject on which he had written early and often. He makes out a strong argument in favour of this procedure, and it may be said that it is chiefly due to his insistent teaching that the ophthalmoscope is now in such constant use in the hands of neurologists. He quotes physicians and ophthalmic surgeons in support of his repeated allegation that marked optic neuritis may be present with perfect vision. Numerous cases are cited in which marked optic neuritis was present, yet no change was discoverable either in the acuity of vision or the extent of the fields. Yet in many of these cases post-mortem examination revealed the presence of intracranial tumour or the subsequent progress resulted in blindness. The practical importance of the discovery of optic neuritis is pointed out not only with reference to prognosis, but also in regard to treatment, and it is again pointed out that neuritis may coexist with good vision and may pass off, leaving sight good.

---

[1] *Med. Press and Circ.*, 1879, xxvii, n.s., pp. 439, 459, 479.

I fear that insistence on the fact that optic neuritis does not necessarily mean impairment of vision is still not unnecessary, for it is not very long ago that on asking whether any optic neuritis was present in a certain case which was under examination I was told that the eyes had not been examined, but that optic neuritis, of course, was not present, for the sight was quite good!

Dr. Jackson published an important paper[1] on eye symptoms and tabes. It may be said that nearly all he tells us on the subject is now commonplace knowledge, but at the time it was written the paper set out points not then clearly grasped. He mentions three non-ocular signs in tabes—lightning pains, loss of knee-jerks, an ataxic gait—and three ocular—paralysis of oculomotor nerves, pupil changes (especially the Argyll-Robertson phenomena), and optic atrophy; whilst he clearly indicates that not all of these occurred simultaneously in many cases of tabes, but that two or three of them not infrequently occurred in the same case. But the important point was the recognition of any one of them in a patient as indicating the likely nature of the case and as suggesting the possible presence of others if carefully looked for.

In the same volume[2] there is the record of a very interesting discussion on "Optic Neuritis in Intracranial Disease" in which Dr. Jackson took part. His contribution is full of facts, and has many suggestive questions as well as statements. It is in six sections. The first deals with optic neuritis ophthalmoscopically. He says he used arbitrarily to make two stages in optic neuritis: (1) slight œdematous swelling, and (2) a climax of extensive great swelling with hæmorrhages and strangulation of vessels; but he avers his belief that there is but one kind of optic neuritis from intracranial disease. But he points out again the simulation of the optic neuritis of intracranial disease by the condition found in Bright's disease, and mentions a case in which he himself had made the diagnosis of brain disease simply from the appearance of the fundus oculi, yet post mortem no such disease was found, but the patient, a young boy, was found to have granular kidneys. He asks, Can the fundus condition in such cases, as well as in cases of meningitis, be definitely distinguished from that in cases of intracranial tumour?

---

[1] *Trans. Ophth. Soc. U.K.*, 1881, i, pp. 139-154.

[2] *Trans. Ophth. Soc. U.K.*, 1881, i, p. 60.

The next section (2) deals with clinical facts. Uni-ocular optic neuritis rarely occurs in cases of intracranial tumour. When it does, what is its significance? Does it ever result from cerebellar disease? He says he believes the diagnostic value of optic neuritis is not different whether sight be good, defective, or bad. But physicians see more cases in which the vision is good than with even defect of sight.

He also refers to the occasional temporary failure of sight and the rapid permanent failure of sight which occur in some cases, and inquires as to their significance. The third section is devoted to a consideration of optic neuritis with other symptoms, non-localizing, such as vomiting, general headache, &c.; and localizing, such as unilateral convulsions, slowly progressive unilateral weakness of limbs, head enlargement, sudden hemiplegia, as from hæmorrhage into a tumour, reeling gait in cerebellar cases, and cranial nerve palsies: and he points out that optic neuritis does not occur in ordinary epilepsy, with complete aphasia, or with extreme mental conditions. Section 4 deals with the diagnostic and non-diagnostic value of optic neuritis. It usually occurs with intracranial tumour or some other adventitious product. The mass may be in any part of the encephalon, although probably tumour in the medulla oblongata rarely produces optic neuritis. Yet it may be absent with tumour in almost any part—i.e., "optic neuritis occurs with tumour in any part of the encephalon, and may not occur with tumour in many parts of it." Also it may occur late in cases of cerebral tumour, or it may appear late and pass off, the patient dying ultimately of tumour. It is rarely found with softening from clot, it is not caused by mere destruction of any part of the encephalon, and, as has been insisted on before, it may be unattended with impairment of sight. Optic neuritis points to the general nature of the local disease, not to its particular nature. It means, as a rule, "foreign body," and so far as the optic neuritis is concerned that produced by a syphilitic or gliomatous "lump" is not to be distinguished from that produced by any other kind of foreign body.

It is important to distinguish between the development of neuritis from a foreign body and loss of sight from a destructive lesion. Thus hemiopia is usually the result of a destructive lesion and in itself implies no change in the fundus. Of course, a tumour so situated as to cause hemiopia will probably also cause optic neuritis. Yet in the ordinary hemiopia from a hæmorrhage or clot fundal changes do not occur.

"The several different lines of evidence agree in converging to the conclusion that optic neuritis in cases of intracranial adventitious products is to be looked upon as resulting secondarily from such products in their general, or more correctly, in their abstract character—that of 'foreign bodies.'"

Section 5 deals with the various hypotheses as to the mode of production of optic neuritis:—

(1) von Graefe's idea that it is produced by raised intracranial pressure inducing venous congestion in the central vessels of the optic nerve. Against this is the fact that a small tumour may cause intense optic neuritis and that a large hæmorrhage may not cause—does not cause—optic neuritis.

(2) Hypothesis of Schmidt, which ascribes optic neuritis to distension of the optic nerve sheaths.

(3) Hypothesis of Benedict, first hinted at by Schneller, viz., that of reflex vasomotor action (analogy of convulsion) by induced instability in grey matter, and action in influencing vessels in optic nerves; also loss of sight, temporary and sudden, does occur with optic neuritis, and often occurs at onset of the convulsion. Secondary changes in the brain are certainly produced by tumour, as is shown by epileptiform seizures. Optic neuritis is thus supposed to be a doubly indirect result of tumour. The sequence is supposed to be tumour, changes of instability, effects produced by the latter on muscular-walled arteries of optic nerves and centres. Dr. Jackson considers this hypothesis *the most plausible.*

The sixth section deals with treatment. Optic neuritis, although secondary to tumour, becomes independent of tumour, becomes autonomous. He supposes that if we were able to reverse all central changes which had led to optic neuritis the optic neuritis would remain for treatment. He thinks it clear that the neuritis does become autonomous because atrophy which is permanent ensues when all other signs of cerebral disease are gone, when this disease has become quiescent. The best time for treatment is early. Hence the importance of early recognition by the use of the ophthalmoscope.

Dr. Jackson reported a case[1] of ocular movements produced by pressure on a diseased ear. He had at various times written on Ménière's disease and on the vertigo occurring in that condition. Vertigo, indeed, was a symptom which always excited his interest, whether it was ocular or auditory in origin, or if it were associated with epilepsy. The patient was a woman with old-standing otorrhœa, in whom pressure on the right tragus produced movements of eyes—slow—to the *left,* followed by quicker movement back to the *right.* Objects appeared to move to *left*—i.e., with slower jerks. When she improved and jerks to *right* became slower, she was able to see objects move also to right. He supposes that pressure on the tragus was transmitted by the chain of bones to the contents of the semicircular canals, and changes in the canal were propagated through cerebrum or cerebellum, possibly both, to ocular muscles. The case is also important as showing dependence of vertigo on ear disease. The patient was subject to giddiness and even occasional reeling.

---

[1] *Trans. Ophth. Soc. U.K.*, 1883, iii, p. 261.

Dr. Jackson's Bowman Lecture was delivered before the Ophthalmological Society on November 13, 1885. It is a philosophical treatise on Spencerian lines, but with definite practical application. Differentiation or division of labour, he says, is a universal law, and the body medical is, of course, subject to this law. Specialism is therefore a natural outcome, but specialists have to justify their differentiation. But the modern doctrine of evolution involves more than differentiation. The other factors are increasing definiteness, increasing integration and increasing cooperation. The ophthalmic surgeon has justified himself in the factor of definiteness by his work on ocular muscles and errors of refraction—he has justified himself in the factor of integration. Thus Argyll-Robertson, in the pupil-symptom, has given to neurologists not merely a new symptom but a means of investigation of several important diseases, and neurologists like Westphal and Erb have paid back the debt by showing the diagnostic value of the knee-jerk. The necessity of the fourth factor, co-operation, is shown, e.g., in such a case as one of hypermetropic headaches. The neurologist may be consulted for the headache, and he ought to be able to suspect hypermetropia as a cause. But only the skilled ophthalmic surgeon can estimate it precisely and correct it accurately.

The complexity of some nervous diseases is, he says, often underrated. Epileptic paroxysms and their after-conditions are an illustration of such complexity. When the symptomatology of epilepsy is considered there is shown the necessity of different, definite, wide knowledge and co-operative work. Ophthalmic surgeons, aural surgeons, alienists and psychologists can all contribute to our knowledge of the symptomatology of the disease. Thus the ophthalmic surgeon may investigate the fundus. He may study visual auræ—colour warnings or "seeing faces": the condition of the pupil will be observed. Thus in uræmic convulsions the pupils may be dilated and become smaller after the paroxysm. Vertigo also will have to be investigated by the ophthalmic as well as by the aural surgeon. The condition of the eyes after a paroxysm will also be observed. Beevor found they were deviated to the side opposite to that to which they deviated at the commencement of an attack. Another curious eye symptom in the epileptic aura will demand attention—viz., the apparent alteration in the size and distance of objects, comparable with the micropsia after the instillation of atropine. Such are some of the phenomena requiring investigation in epilepsy at the hands of an ophthalmic surgeon.

But there are other non-ophthalmological symptoms of epileptic paroxysms, especially of those of organic parts. These are an important part of the evidence, showing that the "organ of mind" (the highest centres) represents all parts of the body. The highest centres are the organ of will, memory, reason and emotion, the four elements of mind, i.e., of consciousness.

> "No wonder the epileptic discharge beginning in some part of the 'organ of mind' produces universal bodily effects, animal and organic. Unless retinal impressions corresponding to colour of objects, and ocular movements corresponding to shape of objects, be represented in the highest centres, how are we to account for the physical bases of visual perception and ideation? If the organic parts are not represented in the highest centres, an emotional manifestation, say of fear, is unaccountable, and so, too, are the physical symptoms of some cases of melancholia, the insanity of fear (anxiety, depression, &c., being only 'fear spread out thin')."

Much attention is given to the movements of chewing or tasting, swallowing, &c., in association with slight fits, and especially associated with the "dreamy state." He expresses the belief that they, as well as another phenomenon occurring in epileptic warning—the apparent alteration in size or distance of external objects—are the indirect (reflex) results of epileptic discharges of sensory elements. He also believes that the "dreamy state," "seeing faces," "hearing voices," and such elaborate mental states arise during slightly raised discharges of healthy nervous arrangements—i.e., arrangements untouched by the epileptic discharge. The "dreamy state" he regards as a very voluminous mental state—not an aura, although it has been called an "intellectual aura"—and he believes that the subjective sensations—smell, taste (chewing movements, &c.), and the epigastric sensations—most often occur in cases of epilepsy in which there is a dreamy state, and depend upon lesions in the cortical area supplied by the posterior cerebral artery. When the warnings are of colours or sounds, the lesion is probably in the cortical area of the middle cerebral, and he enunciates his belief that the nervous changes (discharging lesion) in epilepsies are not primarily but only secondarily nervous: that in most cases they are secondary to embolism or thrombosis of small arterial branches.

Attention is next directed to the after-condition of epileptic paroxysms. Insanity may occur in at least two forms, post-epileptic "unconsciousness" with mania and acute dementia (coma). Physically this is universal paralysis, and paralytic phenomena are present, such as transitory lateral deviation of the eyes, exaggerated knee-jerks and ankle clonus.

For the study of such a complex disease, therefore, the neurologist must avail himself of the work done by different specialists. "We require many different kinds of *definite* or technical knowledge." "All the sagacity in the world will not suffice either for practical ends or for the scientific investigations of complex problems without technical knowledge." The only method of investigating such a complex disease is that by the use of hypothesis, and it is suggested that the hypothesis of evolution should be adopted for this purpose. According to this all parts of the body are represented in each of three levels of evolution :—

> "Representation increases in differentiation, definiteness, integration and co-operation, from lowest centres to highest. centres. The 'organ of mind' is nothing else than a series of centres representing or, what is the same thing, co-ordinating all parts of the body 'from nose to feet' in greatest complexity. The evolutionist does not attempt the marvellous feat of 'getting the mind out of the body'; he only tries to get the physical bases of mind (highest centres) out of the rest of the body."

To test this evolutionary hypothesis one should use the experiments which disease makes in effecting dissolution. Thus paralysis of ocular muscles from affection of their nerve trunks is an example of disease of the lowest level. So are ophthalmoplegia externa and interna. Lateral deviation of the eyes occurs in lesions of the middle motor level, and deviation of the eyes in and after epileptic fits are probably the result of lesions in the physical bases of innumerable visual ideas and other mental states.

It is also suggested that we may have atrophies of cells to organic parts analogous to atrophies of anterior horn cells. Thus diabetes may be the result of a nuclear atrophy of cells of that part of the great vasomotor centre which especially governs the hepatic artery. Similarly Graves's disease and myxœdema may be of similar etiology.

These, of course, we regard as being lesions of the lowest evolutionary level. But these examples must be compared and contrasted with the symptoms of negative lesions of the highest level. After an epileptic fit the condition is one of nearly universal paralysis (dissolution effected) :—

> "Since the epileptic discharge starting in the highest level produces effects in nearly all peripheral parts, currents from this primary discharge must have traversed and discharged more or less of the middle and lowest centres in order to get at the periphery. Hence the paralytic condition after a severe fit will be a very compound one, all orders of centres being somewhat affected, but in different degrees."

In conclusion, it will be urged that the neurologist, by availing himself of the work of ophthalmic surgeons, aural surgeons, laryngologists, and others, along the lowest line of evolution, by working himself at the middle, by co-operating with alienists in the study of diseases of the highest level, may hope to justify his specialism. And the different workers may hope to add different knowledge, to attain to more definite knowledge, to further the integration of general medical knowledge, and to lead to higher and more methodical co-operation of different workers.

In 1886 there was a discussion[1] at the Ophthalmological Society on Graves's disease. Dr. Jackson's contribution was brief but important. He said that he attached much importance to von Graefe's sign, although he had seen well-marked cases of Graves's disease in which it did not occur, mentioning in illustration two cases in sisters. He suggested a comparative study of such cases with some other family diseases. He mentioned that in the recent cases of Graves's disease he had seen, eight in number, the right lobe of the thyroid was the larger, a fact bearing on the question of the central pathology, as Dr. W. A. Fitzgerald had suggested, for the right vagus had, in some lower animals, more inhibitory influence on the heart than the left. He also expressed the opinion that the hypothesis of a central pathology was the most probable, and referred to the experiments of Brown-Séquard and Filehne on the production of exophthalmos by injuries of the restiform body. In all cases of fatal Graves's disease the medulla oblongata and pons Varolii should be carefully examined microscopically. He referred to a case mentioned by Dr. Warner and Dr. Bristowe, in which there was *ophthalmoplegia externa*, and a case which he had seen complicated with asthmatic paroxysms, and one with paroxysms of right facial spasm. Dr. Pavy had noted the association of Graves's disease with diabetes. In the so-called complicated cases the association might be accidental, but they deserved investigation. He did not remember seeing Graves's disease in a man.

---

[1] *Trans. Ophth. Soc. U.K.*, 1886, vi, pp. 25-124.

In his Presidential Address[1] to the Ophthalmological Society Dr. Jackson says that no department of medicine had greater attraction for him than ophthalmology. It was the first subject at which he specially worked after his student life, and he gratefully acknowledges (as he so often does in his writings) his indebtedness to the example and teaching of Jonathan Hutchinson while he was his clinical assistant at Moorfields. He emphasizes the benefits of the opportunities for being well disciplined in exact observation which an ophthalmic hospital affords, and the effect of such discipline in teaching students to avoid vague and indefinite statements :—

> "Since six cranial nerves and the sympathetic nerve," he goes on to say, "supply the eyeball and its apparatus, it is evident that without a good knowledge of eye diseases, the thorough investigation of very many morbid affections of the nervous system is not to be methodically carried out. . . . Unless the physician uses the ophthalmoscope by routine, he will often enough overlook the best evidence—and I am convinced in many cases the only decisive evidence—of gross organic disease of the brain there is to be had ; and if, as is most often the case in a physician's practice, sight be good, he will not surmise that there is anything wrong with his patient's optic nerves and will very likely be incredulous when some one who has looked at them tells him that there is swelling of the disc."

Further, without special knowledge, paralysis of the superior oblique may be overlooked, and the symptom—vertigo—for which the patient seeks advice may be misinterpreted. So also hypermetropia as a cause of headache may be overlooked, and the hypermetropic disk, unless one is familiar with its appearance, may be regarded as a condition of optic neuritis indicating serious brain disease. So that "without a good knowledge of ophthalmology a methodical investigation of diseases of the nervous system is not merely difficult but impossible."

He also suggests that cases of uni-ocular optic neuritis with tumour of one hemisphere are the cases which will throw most light on the process by which optic neuritis results from disease in various parts of the encephalon. "At present," he says, "there are only hypotheses as to this process," although he regards the hypothesis of vasomotor action as the "most plausible." Various other conditions have to be accounted for, the epileptiform paroxysms, the sudden temporary loss of sight, the vomiting, and slowing of the pulse, the tendency to sudden death; and the question is asked, Do these symptoms, not dependent upon optic neuritis, depend upon a similar morbid condition in other nerves, such as the pneumogastric and its centres, as suggested by Dr. Thomas Buzzard?

---

[1] *Trans. Ophth. Soc. U.K.*, 1890, x, pp. xlix-lx.

The integration of ophthalmological knowledge may also help by the study of nystagmus to elucidate the tremor of Graves's disease and the various occupation spasms such as writer's cramp, and the work of the ophthalmic surgeon in ocular paralysis may help to the interpretation of inco-ordination produced by destructive lesions of nervous centres in animals. Further, in the study of eye conditions we are most likely to be able to trace the ascending complexity in the evolution of movement from ocular muscles to their representation in most complex movements in the highest motor centres—i.e., in the physical bases of visual ideas. Such a study would do much towards showing that the organ of mind is sensori-motor, and we should then place the study of epilepsy proper and insanity on a realistic basis. Further, the great importance of a study of ocular paralysis is insisted upon in reference to the question whether mental states do or do not occur with the "outgoing" currents as well as with the "ingoing" current, and this question should interest alienist physicians in ophthalmological work. Physicians can help ophthalmology by showing and investigating cases such as spasmus nutans with nystagmus; surgeons, cases of tetanus, as to whether ocular muscles are implicated in this disease; and aural surgeons, cases of auditory vertigo, especially if associated with ocular movements. He concludes with a quotation from a paper by Dr. James Anderson:—

> "It seems to me the best and most hopeful feature of ophthalmology that it has relations, closer or more remote, with every branch of medicine and surgery—indeed with almost every branch of science."[1]

In the introductory part of this address I referred to the series of "Neurological Fragments" published by Dr. Jackson. The first of those deals with a very interesting condition. Mendel,[2] as a result of a series of experiments on animals, formulated the hypothesis that the oculo-facial group of muscles (frontalis, corrugator supercilii and orbicularis palpebrarum) is really innervated from the third nucleus, although the fibres to these muscles are distributed in the seventh. A case published by Dr. Tooth and Dr. Aldren Turner[1] lent support to this view. In the first " Neurological Fragment " Dr. Jackson considers the same point, and gives an account of the investigation of two cases of ocular palsy, with ptosis, in which weakness of the orbicularis could be demonstrated. He alludes to the fact mentioned by Duchenne that the orbicularis palpebrarum really consists of four muscles, and to the fact mentioned by Fuchs that with regard to closure of the lids we have to distinguish between moderate closure, as in winking and sleeping, and the process of screwing the lids tightly together. No doubt, Dr. Jackson says, the muscle is represented in several places in the central nervous system according as it takes a share in different movements. He suggests that one of these places for the representation of the orbicularis palpebrarum is that in which the external ocular movements for directing the eyes for the estimation of distance are represented. Presumably the peering movements of a short-sighted person—movements helping him to see better—will be represented along with certain movements of the eyeballs, and as the third nerve is that chiefly implicated in ocular movements, their representation so far as these ocular movements are concerned will be most probably in the nucleus of the third nerve.

---

[1] *Ophth. Rev.*, 1889, viii, pp. 33, 65, 97.

[2] *Neurol. Centralbl.*, 1887, p. 537.

In the second " Neurological Fragment " he refers to the interesting class of cases in which, with congenital ptosis, an elevation of the eyelids can be produced by masticatory movements, but especially by lateral movements of the jaws produced by the external pterygoid muscles, a fact suggesting, as was pointed out by a committee which investigated Marcus Gunn's case of this character, that in such cases the levator palpebrarum is supplied both from the nucleus of the third nerve and also from the external pterygoid portions of the nucleus of the fifth nerve.

> " It seems pretty clear," he says, " that the point of emergence of a nerve trunk from the central nervous system is a very untrustworthy clue to the nuclear origin of the several fibres making it up."

In the third " Neurological Fragment " suggestions are made as to the use of cocaine for the investigation of abnormal conditions of the eyes, taking advantage especially of its characteristic that it stimulates the ending of the sympathetic, dilating the pupil and widening the ocular aperature. He suggests, e.g., observations on the effect of cocaine on the Argyll-Robertson pupil and in the conditions of suddenly occurring immobility, under all conditions, of one pupil, with dilatation and loss of accommodation of the same eye, and on the reaction of the pupil to cocaine at different ages. Cocaine should also be used, he suggests, in cases of congenital ptosis in order to ascertain by its effect on Müller's muscle (stimulation of which in the normal condition widens the ocular aperture), whether that is affected in those cases as well as the levator palpebrarum.

---

[1] *Brain*, 1891, xiv, pp. 473-495.

The fourth "Neurological Fragment" deals with the condition of the pupil and eyelids in cases of paralysis of the cervical sympathetic. Long ago,[1] he mentions, Jonathan Hutchinson drew attention to the peculiarities of ocular paralysis from lesion of the cervical sympathetic. In cases of fracture-dislocation of the cervical spine the pupils may be of equal size and may contract to light and during accommodation, yet if the investigation is not pushed further a very interesting sign may be missed. After speaking of paralysis of the "dilating" fibres of the pupil in such cases Mr. Hutchinson wrote:—

> "This is a very important and valuable symptom. It occurs only when the injury is in the cervical or upper dorsal region. The pupil is neither dilated nor much contracted. It is simply unable to dilate. Unless carefully examined the myosis, being so slight in degree, may easily be overlooked. The plan is to examine the eyes in shade, and you will then find that the pupils remain just of the same size as they were when exposed to light. Sometimes one pupil is more definitely contracted than the other."

Dr. Jackson mentions a case of a wound of the neck under the late Marcus Beck, in which only one eye was thus affected. The pupil of the affected eye did not dilate, as did that of the other eye when his back was turned to the window, nor did it dilate on faradic excitation of the skin, and Dr. Head found that cocaine had no action on the pupil or on the lids of the faulty eye. Cases of rupture of the brachial plexus, cases of thoracic aneurysm, cases of wounds and tumours of the neck, should be investigated in reference to this point, and so also should cases in which the small muscles of the hand are affected, especially cases of syringomyelia and of anterior poliomyelitis. He had referred in the Bowman Lecture to a case which he supposed to be a case of progressive muscular atrophy in which there was affection of one pupil believed to betoken paralysis of so-called dilator fibres given off by the cervical sympathetic nerve to the iris and to Müller's muscle—a case which he now, by reference to the original notes, had little doubt was one of syringomyelia. He had been puzzled by finding no such pupil abnormality in undoubted cases of the Aran-Duchenne type of progressive muscular atrophy. He suggests that fibres ultimately passing in the cervical sympathetic to palpebro-ocular structures may not go through anterior horns, and if they do they may not atrophy in Aran-Duchenne progressive muscular atrophy. The effect of cocaine in such cases and in cases of anterior poliomyelitis—the hands being affected—may throw light on the exact course of the fibres in question.

---

[1] *Lond. Hosp. Reports*, 1866, iii, p. 364.

In a paper, the last which he published,[1] "On Some Abnormalities of Ocular Movements," in association with Mr. Leslie Paton, a series of very interesting observations and experiments is described, undertaken with the view of elucidating whether "erroneous projection" which occurs in paralysis of, e.g., an external rectus muscle, is the result of an increased outgoing current as held by Bain and Wundt, or of an ingoing current, as suggested by Müller and a little later by James. He remarks that movements of both eyes are represented in each half of the brain, but the lateral movements of both eyes to one or other side are most specially represented. But as he had remarked[2]:—

> "Every movement called voluntary will be represented in the cerebral hemispheres, and thus there must be representation in them of all ocular movements a man can effect when he tries. I asked Dr. Risien Russell to make researches on this matter. At my suggestion he cut the right external rectus and the left internal rectus of a monkey, thus rendering movements of the two eyes to the right impossible. Upon faradic excitation of the animal's left cortical area, the eyes turned directly upwards or directly downwards, according to the particular part of the eye area stimulated."[3]

This suggestion of Dr. Jackson's has always seemed to me one of the simplest yet most illuminating which he ever made.

The basis of the experiments, undertaken with Mr. Paton, was the artificial simulation of paralysis of an external rectus muscle by an appropriate prism. So far as secondary deviation and erroneous projection are concerned there will be no material difference between prism paralysis and ordinary external rectus paralysis. But it is obvious that as all the nervous tracts ingoing and outgoing remain intact, such an experiment can offer no support either to the outgoing or ingoing theory. But an interesting and almost crucial observation was made on a man who had paralysis of the left third nerve, paralysis of the right sixth, and paresis of the right third nerve, upward, downward and inward movements being defective. The varied observations on erroneous projection need not be detailed, but the result of these, in the words of the observer, "seemed to be definitely opposed to the hypothesis that the false projection in the case of one eye where one of the muscles is paralysed may be due to impulses coming up from the muscles of the sound eye," for as soon as one of the paralysed muscles of the right eye was called into action the patient got false projection in the direction of action of the respective muscles. Such an effect in this case could not be the result of afferent impulses from the other (the left) eye, which was covered, since the left eye was always in a position of left deviation.

---

[1] *Lancet*, 1909, i, p. 900.

[2] *Lancet*, 1894, i, p. 1053.

[3] See *Journ. of Physiol.*, 1894, xvii, pp. 1, 378.

It is not easy to sum up briefly the outcome of Dr. Jackson's teaching in the various papers to which reference has been made. From the practical point of view his insistence upon the routine use of the ophthalmoscope is to be noted, because of the importance of its revelations in reference to diagnosis, prognosis, and treatment, and because of the scientific bearing of its discoveries on the symptomatology of intracranial and other disease. Optic neuritis itself, he asserts, has no localizing value, but he says that the study of instances of uni-ocular optic neuritis, and the careful examination by every means in our power of such cases, may furnish us with a clue to the discovery of the real nature of optic neuritis. It is interesting to know that at one time, impressed apparently by the association of speech defect with lesions of certain parts of the left hemisphere, he thought that defects of sight might be similarly associated with disease in a part of the right hemisphere.

> "I have been struck with the greater frequency," he says, "with which I have found optic neuritis with hemiplegia on the left than on the right side. The facts I have observed go to prove that disease in a certain region of the left hemisphere produces loss of speech, and other facts go to show that disease in the corresponding part on the right does not affect speech at all. Having found disease here on the right, with amaurosis, several times, I have been led to pay much attention to this part, and I was at one time sliding into the belief that disease of it might be more likely to induce amaurosis than disease of the other parts of the right hemisphere."[1]

---

[1] *Roy. Lond. Ophth. Hosp. Reports*, 1866, v, p. 56.

A second point which emerges from a consideration of these papers is the importance he attached to ocular palsies in relation to vertigo. The study of this he connected directly both with epilepsy and locomotor ataxy, and also with labyrinthine disturbances, but he dwelt on its importance in a wider sense, viz., because the facts of ocular vertigo are of great value in supporting from analogy the dictum that the anatomical substratum of a word is a motor, an articulatory, process.

A third point which is to be noted is the remarkably high opinion which Jackson entertained of the educative effect of work carefully and energetically pursued at an ophthalmic hospital. He himself, as he repeatedly acknowledges, derived the greatest help from his early work at Moorfields, both because of the educative effect of the experience and the discipline in exact observation which it imposed. Such work, however, need not lead to a mere barren specialism or differentiation. As a matter of fact it does not, for while ophthalmic studies have resulted in the increase in definite knowledge of eye conditions and diseases, it has also led to discoveries which have been a means of investigation of several important diseases, and it has been productive of the co-operation of neurologists and ophthalmic surgeons in the study and treatment of different morbid conditions. Such considerations obviously embody the evolutionary idea, and have in them the germ of the philosophical treatises on evolution and dissolution of the nervous system to which I have briefly referred.

I feel that I have not done justice to my subject—I doubt whether I could if I were to elaborate it at much greater length. But I end on the note on which I began, for I trust that what I have said may open to some a new book, and may be to others a reintroduction to an old acquaintance. To me the study of these papers has been a source of intense interest and of great pleasure, and I have been anew impressed with the marvellous powers of one who was to many of us here a constant stimulus, and was besides to me a very dear friend.

Sir DAVID FERRIER, F.R.S.: I have pleasure in proposing a cordial vote of thanks to the President for his admirable address. Dr. Taylor has shown himself a profound and appreciative student of Dr. Jackson's work and writings. He has pointed out, and it cannot be done too often, that one of the great services which Dr. Jackson rendered to medicine in general and neurology in particular was his insistence on the routine use of the ophthalmoscope in clinical examination. For as he had shown, particularly in reference to cerebral tumour, the most profound and significant changes in the optic disk may coexist with practically unimpaired vision and be otherwise unsuspected. It would be impossible to specify the lessons taught by the ophthalmoscope in reference to the various forms of disease of the nervous system. I have often tried to represent to myself what neuropathology and neurological diagnosis would be without the ophthalmoscope, but I can only picture obscurity and groping in the dark. Dr. Taylor's address is a cogent demonstration of the value and fruitfulness of Dr. Jackson's pioneer work, and I am sure that all English neurologists will be glad to have it as a permanent record and tribute to the memory of their revered master.

The vote of thanks was seconded by Professor HALLIBURTON, F.R.S., and carried by acclamation.

Neurological Section.

President—Dr. JAMES TAYLOR.

(*November* 25, 1915.)

Case of Neuritis.

By JAMES TAYLOR, M.D.

(*In Dr. Taylor's absence shown by Dr. Adrian.*)

GUNNER H. The patient complains of pain and weakness in the left shoulder. He has had no other illnesses and comes of a healthy family. He has been eight months in France and has been employed in lifting heavy shells. Eight weeks ago he had a sudden pain in the left shoulder. The pain was continuous, and it was at its maximum three or four days after the onset. Apart from this he felt well. Five days after the onset of the pain his arm became weak at the shoulder and elbow. The weakness increased until he could not raise his hand above his head.

On admission on November 5 there was slight wasting in the right shoulder and upper arm and considerable weakness in the triceps. The wasting was much greater in the left shoulder, affecting mainly the deltoid and triceps; both these muscles were weak and reacted slightly to faradism but well to galvanism. There were no sensory changes of any kind. The triceps-jerk was absent on the left side, but the other tendon-jerks were normal. There were no signs of disease in the shoulder-joints.

The patient has improved considerably since admission.

(*November* 25, 1915.)

Case of Toxic Polyneuritis (Recurrent) of Motor Type.

By C. M. HINDS HOWELL, M.D.

C. W., AGED 37, Staff-Serjeant in Army Ordnance Corps; admitted to National Hospital from the First London General Hospital on November 16. Patient, a stout man, pale, and a good witness, gave the following history: No history of venereal disease. Health always good till 1899, when he had severe enteric during the siege of Ladysmith. After this he lost power in arms and legs, and was unable to stand; no paræsthesia; no sensory loss. Recovery complete in four months. Thereafter quite well till August, 1915, when in Egypt. Went there in May, 1915, from Ceylon. Legs began to feel weak in August, and suddenly got worse, with foot-drop and inability to stand. Wrist-drop and much weakness in arms fourteen days later. No dysphagia nor involvement of cranial nerves. Sphincters never affected, and could always sit up. Muscles wasted; no fever; urine natural. No improvement till arrival in England in October, 1915. Since then recovery rapid. Non-smoker; drinks two pints of beer daily.

Condition on admission to National Hospital: Cranial nerves natural; no blue line on gums. Motor system: Considerable hypotonia of all muscles; general weakness, with wasting of muscles of arms and legs, with special weakness of extensors of wrist and fingers and dorsiflexors of foot. Sensory system: No anæsthesia detected. Reflexes: Abdominal brisk; plantars not obtained. Tendon reflexes in arms and legs absent. Electrical reactions: Complete R.D. in muscles most affected, although voluntary power was present. Gait: Could walk a few steps with sticks. Wassermann reaction in blood strongly positive.

Has improved very rapidly. Electrical reactions show no improvement.[1]

---

[1] Since the case was shown the cerebrospinal fluid has been examined and found normal; Wassermann negative in it.

(*November* 25, 1915.)

Cerebral Tumour ; Right Post-central, Subcortical.

By C. M. HINDS HOWELL, M.D.

W. P., AGED 39. Admitted on November 11 to National Hospital complaining of pain and weakness of left hand and sometimes of pain in left leg, but no weakness. Past history negative. Wassermann reaction negative in blood and cerebrospinal fluid.

History: Ten months ago paræsthesia in left hand with recurring attacks of weakness in left arm. Sometimes sharp, cutting pain all up left arm; similar, but less severe, pains at times in left leg. Right frontal headache for ten months, with occasional nausea, but no vomiting. Diplopia at times on lateral deviation of eyes. No fits nor tremors.

Present condition: Rather thin man; normal intelligence; good witness. Cranial nerves: No optic neuritis; ocular movements good; no ptosis. Pupils irregular; ill-sustained reaction to light. Slight loss of sensation to pin-prick and cotton wool on left face. Weakness of left face much more marked for voluntary than emotional movements. Tongue protruded naturally. Motor system: Very slight loss of power in left hand and arm; left leg powerful. Sensory system: Slight loss of sensation to pin-pricks, cotton wool and temperature over whole of left side of body. Defect becomes increasingly obvious in the left forearm and hand. Here four out of five touches with cotton wool are missed. Deep pressure occasionally felt in the hand, but usually missed. The compass test gives no threshold. Complete loss of sense of passive movement and position in hand, forearm, and elbow. At shoulder there is partial loss. No loss of deep sensibility in leg and foot. Reflexes: Arm-jerks brisk on either side. Knee-jerk more marked on left than on right. No knee- or ankle-clonus. Abdominal reflexes very weak left, brisk right. Plantar reflexes usually indefinite; an extensor on left has been noticed. Gait normal. Sphincters normal.

(*November* 25, 1915.)

Gunshot Wound of the Lumbar Spine; Injury to the Cauda Equina; Destruction of the Pelvic Autonomic Nerves; Paralysis of the Large Intestine and Rectum; Recurrent Attacks of "Intestinal Obstruction."

By E. G. FEARNSIDES, M.D.

PRIVATE F. J. A., aged 25. Shrapnel injuries to the lower lumbar region, June 22, 1915. Immediately after the injury the patient completely lost power at the left ankle, knee, and hip, developed considerable weakness of the right lower extremity, became unable to pass water, and complained of severe pain in both buttocks, in the back of the left thigh and calf, and in the left ankle and foot. He was seen on June 24 by Lieut.-Col. Gordon Holmes. A wound of entry was found 1 in. below the margin of the iliac crest and 2 in. behind the left lateral line. The right lower extremity had almost completely recovered, but the patient was unable to move either the left ankle or foot; at the left knee extension was unimpaired but flexion was feeble, and at the left hip both extension and flexion were powerful. The left knee-jerk was abolished, the right obtained. Neither ankle-jerk could be elicited. The right plantar response was flexor, but on the left side the toes were stationary. There was no complete loss of sensation to prick or touch on the right leg. On the left, to *prick* there was complete loss over the roots lumbar 5 and sacral 1, 2, 3, 4, 5, and coccygeal, and to *touch* complete loss over lumbar 5 and much diminution over all the sacral roots.

On June 26 Colonel Sargent operated. The track of the shrapnel was followed in front of the spinal theca between the bone and the ligaments, but the missile was not found. The bone and theca appeared healthy, and the spinal membranes were not incised.

On July 1 suprapubic drainage for a foul cystitis and cellulitis of the penis was performed.

On July 17 he was transferred to the Hospital for Epilepsy and Paralysis, Maida Vale, and came under my care. At that time the wound of the back, the suprapubic drainage wound and the penis were extremely septic and surrounded by cellulitis. On the left side of the sacrum was a large bed-sore, and over the head of the left fibula was a pressure sore. The skin over the sole and dorsum of the left foot sweated freely and was covered by sudaminous vesicles. The patient was totally unaware of and was completely unable to control the passage of urine and fæces. Power at the right ankle was diminished, but all movements at the right hip and knee could be carried out. Movements at the left ankle and of the left toes were impossible, at the left knee they were feeble, at the left hip more powerful. The left foot was dropped. The small muscles of the left foot and left calf were flabby and wasted. The patient complained of spontaneous pain shooting down the front of the left shin, in the back of the right buttock, thigh, calf, and in the right foot, and of slight "tightness" in the lower abdomen and back. At the sites of these abnormalities of sensation the patient said the skin was "tender," and on examination over-reacted when potentially painful stimuli came into contact with these abnormal portions of skin. Over the sacral roots on the left side total anæsthesia to all forms of testing (prick, touch, temperature, the vibrations of a fork, &c.) was present. On the right side, over the corresponding distribution of the upper three sacral roots, diminution in sensibility only was present, but the perineum and the saddle-shaped area around was completely insensitive to prick, light touch, and temperature. The right knee-jerk was obtained, the left was abolished. Neither ankle-jerk could be obtained. A plantar reflex on the left side was not obtained, on the right a general drawing away of the whole leg without any movement of the toes was elicited. The bulbo-cavernosus reflex was abolished. All the abdominal reflexes were obtained. The anus was patulous and totally insensitive to contacts and stretching. The patient could not feel the insertion of the catheter.

Between July 17 and August 24, although the signs of nervous interference did not alter materially, the patient's general condition improved strikingly. The various wounds became clean, and the sacral bed-sore and the pressure sore over the head of the left fibula began to heal. The temperature and the rate of the pulse fell to normal. A catheter was passed four times daily, and the bladder washed out. The stools were regular, small, and fluid.

On August 24 the patient complained of indefinite abdominal discomfort, chiefly located in a tender area in the right lower quadrant. He became restless and irritable. On August 25 the pulse-rate rose from about 80 to 130 beats per minute, the tongue became furred, and the abdomen distended. On the evening of August 25 he had

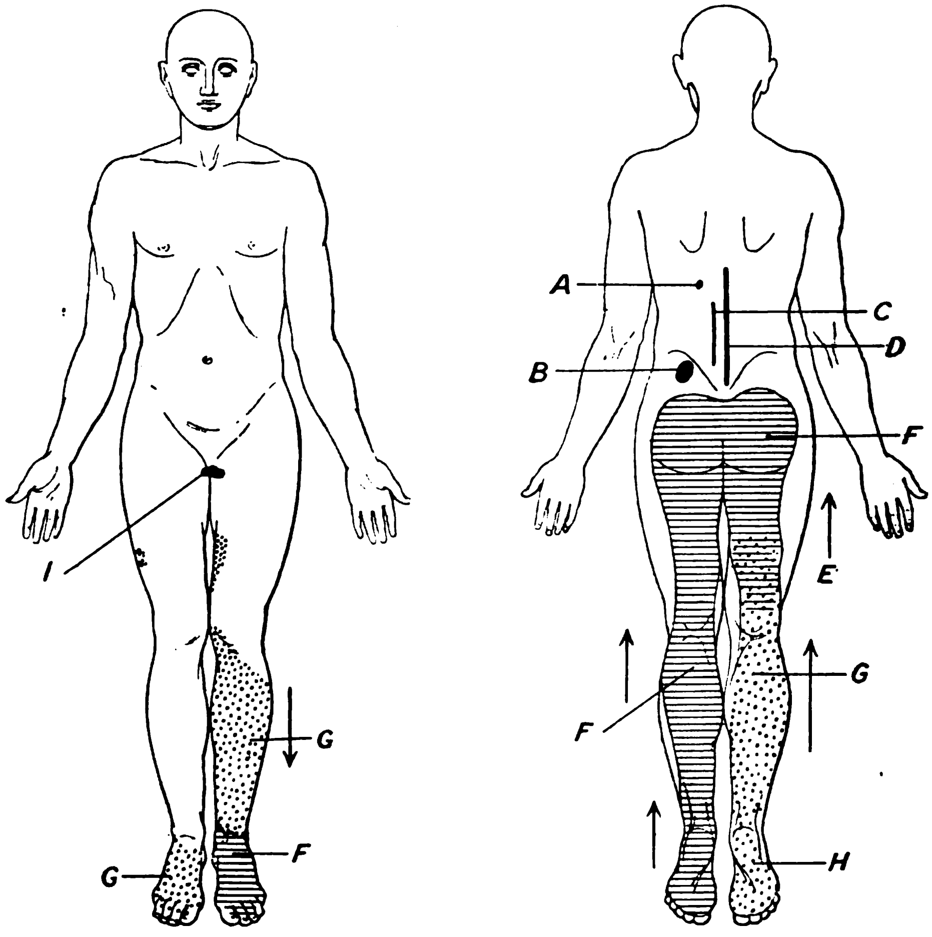


Diagram of the interferences with sensibility during the quiescent periods. The areas of skin totally insensitive to prick, wool, deep pressure, temperature, &c., are lined, whilst those showing "over-reaction," with some raising of the stimulus-threshold and general diminution in acuity of sensation, are stippled. *A* is a small, well-healed scar, possibly the point of exit of a piece of shrapnel. *B* is the large wound of entry, now firmly healed. *C* and *D* are linear scars 4½ in. and 10 in. long respectively of the operations performed in France; a laminectomy of the second and third lumbar vertebræ has been performed. *E* is a region of the back of the right thigh where the anæsthesia is subtotal. The arrows on the diagram point in the direction of increasing sensory interference. On the left leg and over the right buttock at *F* there is a total inability to appreciate prick, cotton wool, heat, cold, and deep pressure. At *G*, on the back of the right calf and over the front of the left shin, characteristic "over-reaction with loss" to potentially painful stimuli is present. *H*, vibrations are still appreciated on the right sole, but the stimulus evoked is weaker and of shorter duration than it is on the more proximally placed segments of this extremity. On the left sole vibrations are not appreciated. *I*, the penis and urethra are totally insensitive to prick and to tension.

bilious vomiting three times in small quantities. The urine this day contained little pus, a trace of albumin, and was acid. On August 26 he was worse. The abdomen had become distended, and on examination was rigid in both iliac fossæ. Vomiting continued. On August 27 he vomited eight times, passed no motion, looked ill with "abdominal facies." On the evening of this day Mr. Blundell Bankart operated.

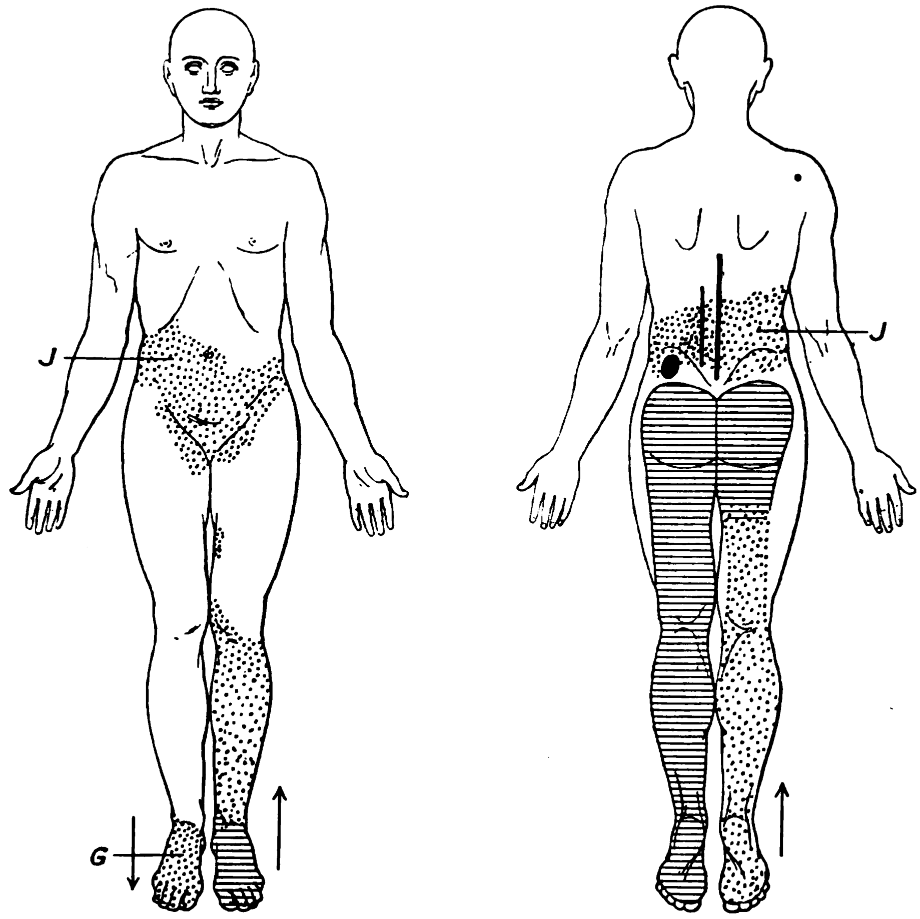


Diagram of the interferences with sensibility at the height of an attack. The areas of skin totally insensitive to prick, cotton wool, deep pressure, temperature, &c., are lined, whilst those which show "over-reaction" to potentially painful stimuli are stippled. *J*, during the attack segmental areas of tenderness on the abdomen and back appear; on the right side these seem to correspond to thoracic nerves 9, 10, 11 and 12, and on the left to thoracic nerves 10, 11, and 12. In these areas no loss of sensibility can be determined, and the threshold to the potentially painful stimuli is not raised. These areas of tenderness thus differ from those at *G*, where sensory loss and "over-reaction" occur together. Moreover, after the attack, this trunk tenderness disappears.

A gridiron incision was made in the right iliac fossa. The appendix appeared normal, and the peritoneum everywhere was healthy. The large intestine, and more especially the transverse and descending colon, was distended. The cæcum contained much gas. In the lower portion of the small intestine a large number of nodules about the size of a chestnut were felt. These were found to be fæcal in nature. No further operative interference was attempted, and the abdomen was closed. After the operation, by means of enemata administered with a long tube and mechanical "digging," a large number of fæcal accumulations were brought away. On the relief of the bowels by these means the patient's general condition rapidly improved, and the rate of the pulse and the temperature fell.

Since this operation the various wounds and pressure sores have healed, and the patient has regained the power of walking. On September 10, October 9, and November 23 three further attacks of "pseudo-obstruction" were witnessed. Each was marked by abdominal discomfort referred to the lower abdomen, and accompanied by referred pain—tenderness over the distribution of the eleventh and twelfth thoracic roots on both halves of the abdomen, distension of the cæcum, colon, and, to a less extent, of the small intestine, rigidity of the lower abdominal muscles, repeated vomiting in small quantities, fæcal in the later stages, tachycardia, pyrexia, and the general picture of an "acute abdomen." Each attack was relieved by the passage of masses of fæcal accumulations, and each occurred after a period in which the bowels were acting apparently normally as regards frequency, quantity, and appearance of the stools.

Comments.—In this case we then have evidence of a lesion of the cauda equina affecting on the left side the coccygeal and sacral roots, and to a slighter extent the fifth lumbar, and on the right the coccygeal and the fifth, fourth, and third sacral roots, and to a slighter extent the first and second sacral, but no evidence of any injury to the conus medullaris of the spinal cord. The urine, which on admission was loaded with pus and albumin, since the middle of August has remained fairly normal; it is now acid, free from albumin, and on culture and to microscopic examination yields only staphylococci. The kidneys at the time of operation were not enlarged and have never been palpable, and no enlargement of the spleen has ever been detected. The fæces have been examined on several occasions for pathogenic micro-organisms, but none has been found. Before proceeding to France the patient was inoculated against typhoid, and his serum now agglutinates typhoid bacilli in dilutions of 1 in 256, but does not agglutinate either paratyphoid A or paratyphoid B, or Shiga's bacillus; on the other hand, an incomplete agglutination to Flexner's bacillus in a dilution of 1 in 32 is obtained (Dr. L. Rajchman). The intestines, as shown by Gaskell and others following him, have a double nerve supply—(1) from the sympathetic outflow in the nerve-roots thoracic 8, 9, 10, 11, and 12 through the splanchnic nerves; (2) from the cranial or sacral outflows. The vago-accessory autonomic fibres supply the whole of the intestinal tract above the transverse colon, whilst the pelvic splanchnics supply the descending colon, sigmoid, and rectum.

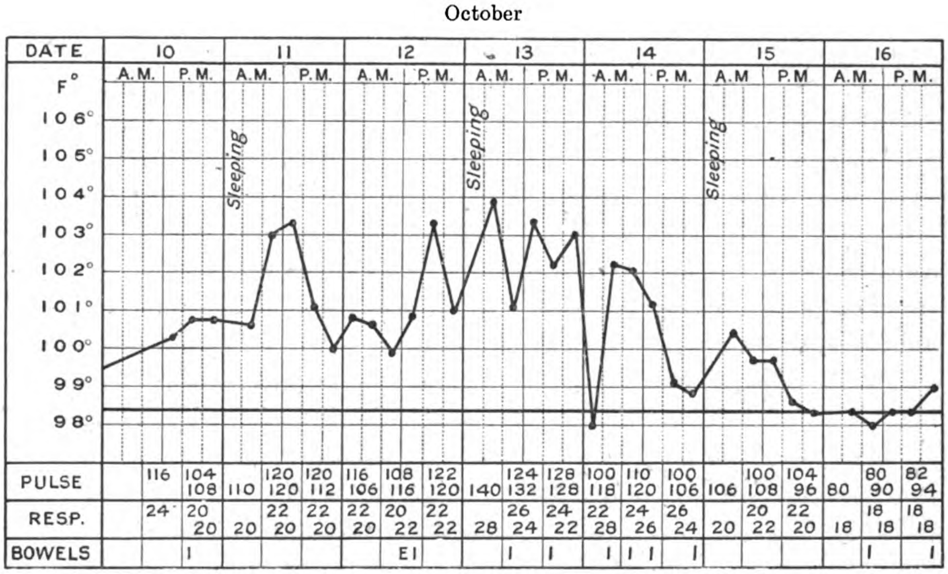


Chart to illustrate the relations of temperature, pulse, and respiration, and the relief gained after the action of the bowels in the four attacks of "intestinal obstruction."

The pelvic autonomic outflow proceeds from the post-plexic portion of the sacral region of the spinal cord, and in this region we have in the case under consideration unequivocal evidence of gross injury. Most of the afferent fibres from the lower portion of the intestine run to the posterior root ganglia with the sympathetic fibres, and in this case they have not been destroyed, for distension of the intestine has always been accompanied by the development of referred pain, tenderness along the distribution of the ninth, tenth, eleventh, and twelfth thoracic nerves.

(*November* 25, 1915.)

Division of Right Antero-lateral Tract of the Cord for Relief of Pain in Tabetic Crises.

By H. S. SOUTTAR, F.R.C.S.

MRS. A. W. first came under observation at the West London Hospital in November, 1911. She then complained of periodic attacks of abdominal pain and vomiting. She had been married for nearly two years and had had one child, which died at the age of 3 months. Two years after her marriage her husband died in an asylum, probably of cerebral syphilis. The attacks occurred at intervals of one to two months, and were sufficiently severe to incapacitate her for the one or two days of their duration.

In April, 1912, she was admitted under the care of Dr. Sydney Owen, and an examination showed the following condition: No abdominal abnormality could be discovered. The knee-jerks could be obtained with difficulty. Her pupils reacted to accommodation but not to light. Some disturbance of cutaneous sensation was noted in irregular areas over the whole body, which showed blunting to the prick of a pin. In April and in May, 1912, the Wassermann reaction of the blood was negative on both occasions, whilst in May the cerebrospinal fluid gave a positive reaction. Albumin was present with a slight lymphocytosis. In May, 1912, an injection of 0·3 grm. of salvarsan was given, and in July a further injection of 0·6 grm.

The patient was lost sight of for a time but appeared again in 1914, the condition having become more severe in the interval.

In December, 1914, an injection of 0·9 grm. of neo-salvarsan was given, and as her condition became steadily worse she was admitted to hospital in April, 1915, for a course of inunction. The attacks by now had become very severe, occurring almost every week, and a second sometimes supervening before the first had entirely cleared up. For two months she was kept under careful observation in hospital. The attacks were of great severity and left her in a condition of complete exhaustion. Vomiting was almost constant during an attack and was accompanied by severe pain referred almost entirely to the left side of the abdomen and to the left leg. During an attack the region of pain became so sensitive that the scratch of a pin produced intolerable pain. Her symptoms could only be controlled by large doses of morphia. During the attacks she also suffered from severe frontal headache, accompanied by tenderness of the scalp and burning pain in the shoulders.

At this time (April, 1915) her condition was as follows: She was a somewhat nervous Jewess showing marked general wasting. It was difficult to fix her attention, but when this could be done her replies were accurate. There was no alteration in her speech and her mentality was fair. On the front of both thighs were scars of old ulcers, probably gummatous.

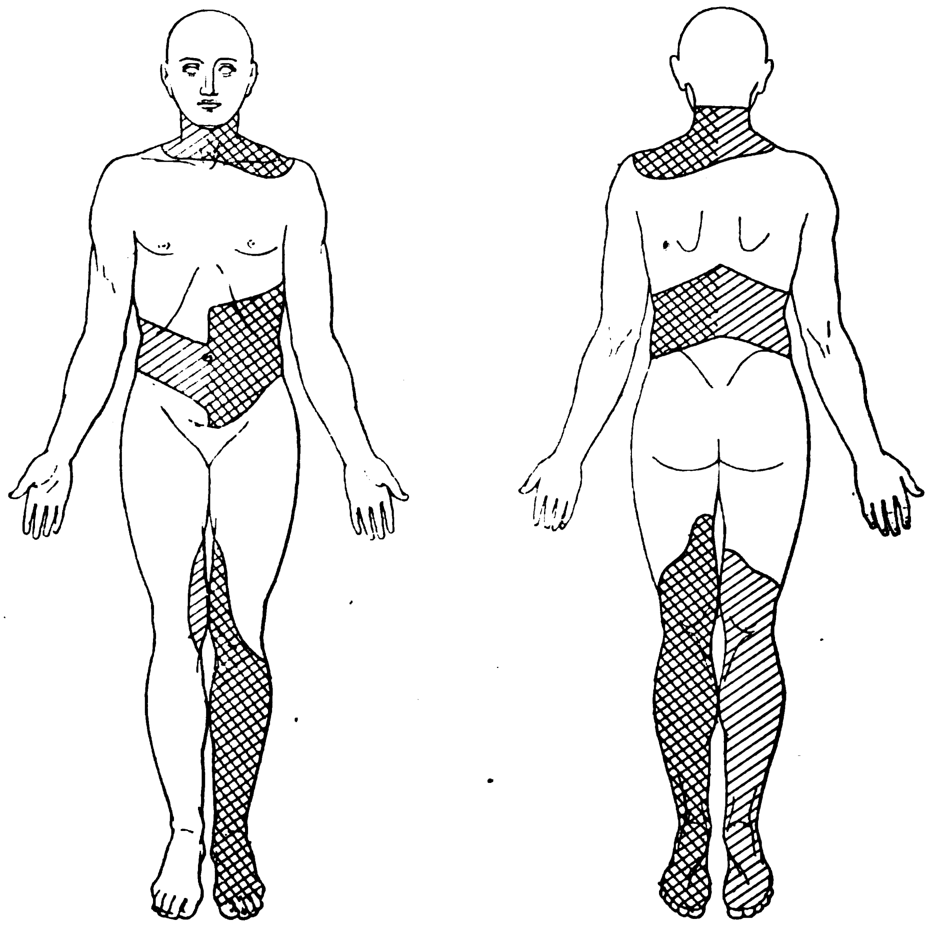
A close examination of the nervous system showed the following abnormalities: The pupils were small and irregular, giving no reaction to moderate light, but reacting well to accommodation and to convergence. There was definite wasting of the lower halves of the trapezii and sternomastoids. The whole muscular system was flabby, but showed no gross hypotonia. There was no alteration in gait. The knee-jerks were obtained sometimes readily and sometimes with difficulty. The abdominal reflexes were present. Over considerable areas of the trunk and legs, and chiefly in the distribution of cervical 2, 3, 4, 5, thoracic 11, 12, and sacral 1, 2, 3, 4, there was marked hyperæsthesia to the drag of a pin. This was especially marked on the left side.

It was decided to give the patient a thorough course of mercurial inunction before attempting any surgical interference.

In October, 1915, she was again admitted to hospital. For the intervening five months she had had daily inunctions of mercury and large doses of potassium iodide. No improvement whatever had resulted, the attacks becoming more and more severe and being now continuous with only an occasional day of freedom. The pain was now strictly limited to the left abdomen and left leg, being specially severe at the inner side of the left knee. Vomiting was continuous and uncontrollable. The patient was becoming almost desperate. Her general condition, however, was not markedly worse considering the severity of the attacks. The distribution of cutaneous hyperæsthesia was now much more extensive on the left side, both in the shoulder, abdominal, and leg areas, whilst in every area a dragged pin produced on the left side a pain far more acute than in the corresponding area on the right. The remainder of the body showed a marked *diminution* of sensibility to prick, bringing the areas of hyperæsthesia into bold relief.

With a view to eliminating the painful element of her attacks, and possibly to reduce their general severity, it was decided to divide the right antero-lateral track of the cord.

Operation.—The patient was placed in a prone position with a large sandbag lying longitudinally under the chest, allowing the shoulders to fall away from the middle line. An incision was made in the middle line extending from the seventh cervical to the fourth dorsal spine. The muscles were stripped away on each side with a rougine, clearing

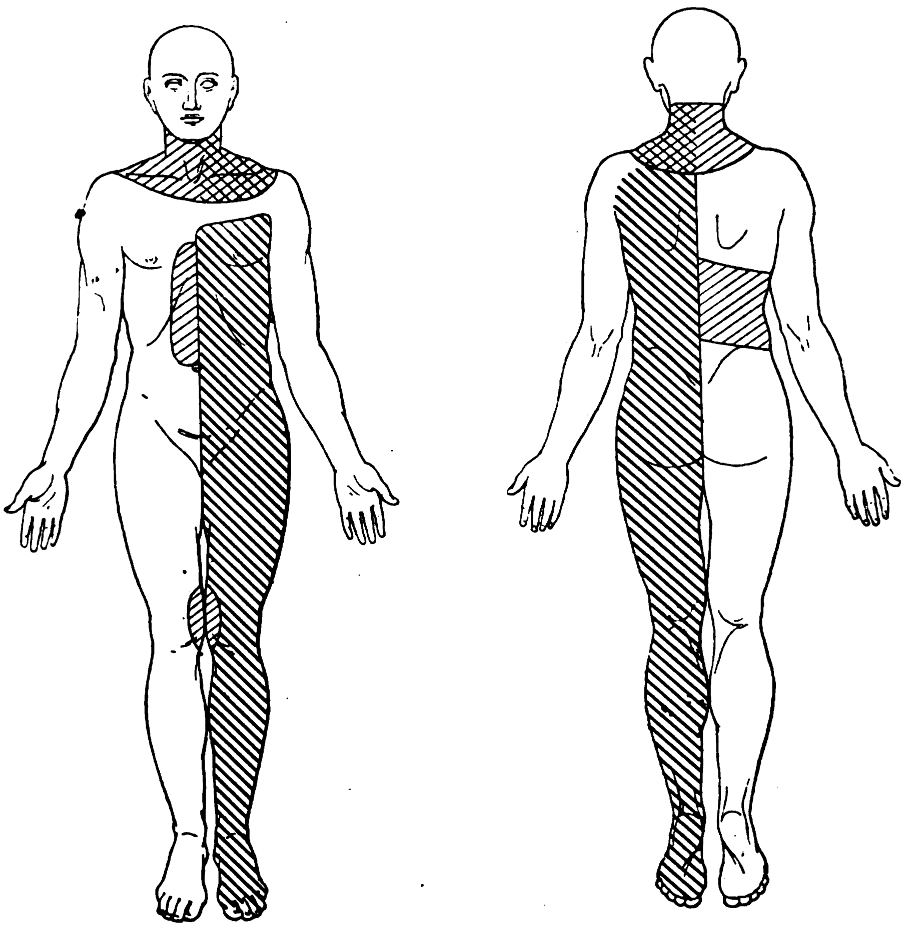


▨ Sensitive to pin-prick.

▩ Hypersensitive to pin-prick.

In all other areas sensibility to pain of pin-prick much diminished. Other forms of sensation normal.

the upper three dorsal arches, and these three spines were nipped off. By means of a ¾ in. trephine the first and second arches were excised, remaining spurs of bone being removed with punch forceps. About 2 in. of the dura were thus exposed. This was opened by a median incision and the edges held apart by thread retractors. A large quantity of cerebrospinal fluid poured out, more than one would ordinarily expect. The cord and membranes were perfectly normal in appearance;



▨ Sensitive to pin-prick.

▦ Abnormally sensitive to prick.

▧ Totally insensitive to pain of pin-prick.

In other areas pin-prick gives a dull response. All other forms of sensation normal, including *painful* heat.

no sign of either recent or old inflammation was present. There were no adhesions. Silk threads were passed round posterior roots of the second and third dorsal nerves, and by means of these the cord was slightly rotated so as to bring its right lateral surface into view. With a special knife having a minute triangular blade, an incision was made into the cord 2 mm. wide, 2 mm. deep, with its posterior extremity 3 mm. in front of the line of origin of the posterior roots, at a point midway between the origin of the first and second dorsal roots from the cord. There was no bleeding from the cord at all. The silk retractors were withdrawn, the dura closed with a continuous silk suture, the muscles brought together with deep catgut stitches, and the skin closed with an intradermic suture of catgut.

The operation occupied three-quarters of an hour, most of which was spent in the preliminary stages. The incision afforded ample room, and the actual section of the cord, though involving delicate handling, was a proceeding of the utmost simplicity. The anæsthetic was a mixture of ether and chloroform. The patient suffered a very moderate degree of shock easily combated by saline infusion.

On October 9, 1915, there had been no trace of paralysis following the operation, and no pain or vomiting except a slight anæsthetic vomit. On the right side of the body and on the left above the level of the operation the sensitive areas remained the same except that the sensitiveness of the right leg was greatly diminished. Below the level of operation the whole of the left side of the body and the left leg were totally insensitive to pin-prick. In the same area cotton wool touch was everywhere perfect, and heat and cold of all degrees were perfectly distinguished, whilst painful heat was instantly felt as pain. Localization and joint sense were perfect. Both knee-jerks were just obtained without reinforcement. Pinching the tendo Achillis produced no pain on either side. On both sides the plantar reflex was downwards.

On October 13, the areas highly sensitive to pin-prick were greatly diminished, including that above level of operation. The patient progressed normally until the evening of October 23, when she complained of severe headache. She slept well, however, but next day had a severe attack of vomiting, absolutely without pain. Two injections of ¼ gr. of morphia were given and the vomiting ceased. She left the hospital on November 1, apparently well.

On November 5 she returned to hospital, saying that she had had a severe attack of vomiting. She was kept in hospital for some days, but as the attack did not recur she was discharged. Although the vomiting was accompanied by headache, in no case was there any pain in any other region, a very striking contrast to her previous condition.

It is believed that this is the first occasion on which a tract of the spinal cord has been divided for the relief of pain in tabetic crises. The operation itself has been performed on three previous occasions: In America, by Spiller and Martin, in 1911, for pain in a case of inoperable tumour involving the cauda equina;[1] in America by Edwin Beer, in 1912, for recurrence of carcinoma of cervix involving sacral roots;[2] in Germany, by Foerster, in 1913, for root pain following on a division of posterior roots.[3]

(*November* 25, 1915.)

Paralysis of the Sympathetic (Birth Injury) with Hetrachroma Iridis.

By M. S. MAYOU, F.R.C.S.

E. N., aged 8, male. Admitted to Paddington Green Children's Hospital on February 23, 1911. The child was delivered by forceps with great difficulty. It was noticed not long after birth that there was a slight droop in the right eyelid. The right pupil is smaller than the left, but reacts to light. The right iris is more bluish in colour as compared with the left, which contains more brown pigment. The right pupil does not dilate so fully as the left and is not dilated by cocaine, whereas the left dilates fully. There seems to be some diminution of lachrymal secretion, and sweating on the right side of the head, together with a slight enophthalmos. The fundi are normal. There is no difference in pigmentation on the two sides. Vision $\frac{6}{6}$ in both eyes.

Remarks.—This is the third case of its kind which has come under my care.[4] They have, all of them, followed prolonged labour with the use of instruments. The alteration in the colour of the iris is probably due to the fact that the paralysis had taken place in very early life, before the development of the pigment in the stroma of the iris which takes place soon after birth. The fact that there is no alteration in the retinal pigment further points to the condition being due to a failure in the development of the pigment in the iris stroma.

---

[1] *Trans. Coll. Physicians Philad.*, 1912, 3rd ser., xxxiv, p. 213.

[2] *Journ. Amer. Med. Assoc.*, Chicago, 1913, lx, p. 267.

[3] *Berl. klin. Wochenschr.*, 1913, l, p. 1499.

[4] *Trans. Ophth. Soc. U.K.*, 1910, xxx, p. 196.

(*November* 25, 1915.)

Case of (?) Syringomyelia and Syringobulbia with Sudden Disappearance of Sensory Symptoms.

By C. M. HINDS HOWELL, M.D.

F. B., AGED 34 (Corporal, A.S.C.), has the following history: Eight years ago first noticed slight weakness and wasting of the left arm and hand; shortly afterwards he noticed that the wrist and hand were numb. For about six years he has noticed that he has burnt his hand and forearm at his work (blacksmith) without feeling any pain. Also cuts on hand and wrist are quite painless; for three or four years his legs have become weak, especially the left, and he has not been able to feel the warmth of hot water when having a bath. He has at times seen double. He has been in France, where his condition got worse, and he was sent home sick; and was admitted to the First London General Hospital, being subsequently transferred to the National Hospital; notes of his state were taken by Dr. Walsh. His state at that time (September to October, 1915) was as follows:—

Special senses normal, with the exception of a most complete loss of taste. Pupils equal, reacting well to light and accommodation. Ocular movements of normal range, with a trace of fine nystagmus on lateral deviation to left; no sign of cervical sympathetic lesion. The jaw deviates slightly to left on opening the mouth. There is weakness of the left face, upper and lower parts being equally affected. Palate and tongue normal. Right upper limb normal muscular power; left, slight general wasting, with weakness of muscles of the shoulder-girdle; this is more pronounced in the forearm, and the thenar group of muscles show pronounced atrophy. The fingers of the left hand are somewhat bulbous. There are scars on the hand and wrist of old cuts and burns. Lower limbs: Power in right is normal; there is general weakness with wasting of the left. The muscles are flabby and there is no trace of spasticity. Sensory system: Complete loss to pain and heat over left half of body and limbs, except for a fairly constant zone round the thorax at the level of the third and fourth segments. For cold there is relatively slight loss over the same areas. Respecting the right side of the body his answers are variable; there seems a relative alteration to painful and thermal stimuli. The face is affected in a widespread manner. There remains a patch on the right cheek where there is only relative analgesia and thermanæsthesia, but the areas here are difficult to map out with certainty. Touch shows relative diminution on left side, and is completely lost below the left elbow; the spine shows no scoliosis. Reflexes: Arm-jerks brisk and equal right and left; abdominals normal right and left; knee-jerks normal right and left; plantars indefinite, but not extensor.

The man came before a medical board at the First London General Hospital, and was discharged from the Army as unfit in October, 1915. Within a fortnight of this date he noticed a marked improvement in his cutaneous sensation, and was referred to me for examination on November 2, 1915. On this date the most careful examination *failed to discover any sensory loss* at all, though the motor condition was as described in Dr. Walsh's note. The power in the arm and leg had, however, improved very considerably. His sense of taste had also returned. Since this date he has maintained his improved sensory condition, and has been re-enlisted in the Army.

(*November* 25, 1915.)

Case of Intermittent Tonic Spasm affecting chiefly the Lower Extremities, Progressive in Character, arising subsequent to an Attack of Measles.

By T. GRAINGER STEWART, M.D.

L. J., FEMALE, aged 8. Complaint, cannot walk. Duration about six months. Family history good; one of a family of eight, all healthy; the youngest is aged 12 and the oldest 18; father and mother healthy; no miscarriages. Past history: Always under-sized and excitable and rather shaky; she walked at the age of 10 months, talked at 2 years, and was rather backward at school.

Present illness: Six months ago she had measles and pneumonia She was able to get up and walk after the attack, but her mother noticed that her feet were inclined to turn inwards. She has been steadily getting worse since and has lost power of walking alone—she can only walk on her toes and has to be assisted. During the past three months her speech has become affected and the right arm is becoming stiff, the child tending to hold the arm extended at the elbow with the wrist flexed and the whole arm pronated (tip position). No history of fits or incontinence.

Present state: Intelligence good; she is a diligent knitter. Cranial nerves: Face asymmetrical; tongue deviated to left. Motor system: Arms—no wasting, fair power, at times considerable tonic stiffness in the right limb and not in the hand, and at times there is involuntary movement of the limb but not of the hand; co-ordination fair. Legs—No wasting; calves hypertrophied; can move legs at hips and knees. Generally the legs are in a state of spasm, the feet in position of talipes equinus, the knees straight, and the hips straight; when there is no spasm the legs can be freely moved at all joints. At night spasm varies, sometimes there is a continuance of rhythmic spasms; co-ordination fair. Gait: Walks on the tips of her toes and needs help. Sensory system: No defect. Reflexes: Tendon-jerks—arms brisk, knee very brisk, ankle brisk when spasm is absent, otherwise not obtained. Superficial reflexes: Abdominal, present and equal; plantar, flexor.

Neurological Section.

President—Dr. James Taylor.

(*February* 24, 1916.)

The following cases were shown by the President:—

(1) Case of syringomyelia which, under observation for over twenty years, had remained stationary.

(2) A case of myasthenia gravis affecting the eye muscles, in which great improvement, amounting almost to complete cure, had taken place.

(3) A case of monoplegia, functional in character, developing after a head injury.

(*February* 24, 1916.)

Myasthenia Gravis and Epileptiform Attacks observed over a Period of Eleven Years.

By E. G. Fearnsides, M.D.

M. F., born 1883. Since 1899 this patient has been subject to characteristic epileptiform attacks, a number of which have occurred whilst the patient has been under observation in hospital. She suddenly comes over giddy, usually falls, loses consciousness, and is seized with a generalized convulsion in which the sphincters may be relaxed. After the attack she suffers from intense headache, is extremely weak, feels fatigued, and on several occasions has become delirious. During each of the last seventeen years she has suffered about eight or ten attacks. In 1902, when still single, one day she noticed that speaking had become difficult, and on the next she complained of severe headache and could not swallow; in the course of a few days articulation and the power of swallowing improved, but ever since 1902 she has complained of some difficulty in deglutition, varying in severity from day to day and from week to week. She married at Christmas, 1903; in the week before marriage she stayed in bed six days because of weakness of her arms and legs, which subsequently entirely disappeared. Whilst carrying her first child, which was born after an easy confinement in February, 1905, her health was fairly good. She first came under observation in August, 1905, when six months pregnant of her second child. Since that time the manifestations of nervous involvement have altered little.

In 1905 she was a well-covered woman aged 22, weighing 8 st. 7 lb. In the heart, vessels, lungs, abdomen, and urine no abnormal signs were discovered. The thyroid was not enlarged and no evidence of any enlargement of the thymus gland could be obtained. She complained that she could not talk for long, that swallowing was difficult, that two or three times a day a pricking sensation would come on, starting in the left foot and passing up over the whole body, accompanied by an intense feeling of weakness in all her muscles, of severe headache often unilateral and right-sided, accompanied by tenderness of the affected region of the scalp, of double vision necessitating the wearing of a shade over one eye. On examination, memory and the mental state were fairly normal. Speech was profoundly affected, syllables being slurred, the voice nasal and phonation tiring rapidly. In conversation her voice would entirely disappear. While in hospital she exhibited several typical epileptic attacks, and after each attack all her nervous manifestations were more profoundly affected. Vision and the optic disks were not affected, and hearing, smell and taste were normal. The pupils reacted normally to light, accommodation and attempted convergence. As an in-patient on some occasions she could not raise her upper eyelids, on others ptosis was absent. The freedom of ocular movements also varied from a complete range to practically complete external ophthalmoplegia. Even when, however, a complete range of movement of lids and of the eyeballs was possible her powers of resistance against the passive opening of the eyelids were feeble. On her "bad" days her power of ocular accommodation tired rapidly, and after reading a few moments she would complain that reading was impossible. Similarly her ability to fix distant objects soon tired. Facial movements were symmetrical and did not tire with extreme rapidity, but she could not whistle and only for short periods could she blow out her cheeks. The lip movements were weaker than those of the rest of the facially supplied muscles. The palate moved well, but after five to ten deep breaths it ceased to move. The tongue on protrusion came out straight and could be held steadily, but after some five to fifteen protrusions it could not be protruded beyond the lips. Swallowing was difficult; the degree of difficulty varied; at times nasal regurgitation was observed. Tachycardia and polyuria were never observed, but palpitation occurred during her attacks. Motion was normal, but all limb muscles tired easily and the characteristic myasthenic electrical reactions were obtained. Sensation was not affected to testing, but subjective feelings of discomfort occurred from time to time. At times she found walking almost impossible, and when sewing or using her fingers in fine manipulations complained that she tired rapidly. The knee-jerks were normal, ankle-jerks were obtained and both plantar responses were flexor. The abdominal reflexes were easily elicited and the action of the sphincters was controlled.

At the Maida Vale Hospital she has been under more or less continuous observation since 1908, but the description of the condition found in 1905 still holds good.

(*February* 24, 1916.)

Hypopituitarism, Dystrophia Adiposo-genitalis, Polyuria and Polydipsia; Bilateral Cortico-spinal Interference; Optic Neuritis and Ptosis on Left Side; No Changes in Sella Turcica; Positive Wassermann Reaction in Serum.

By E. G. FEARNSIDES, M.D.

H. J. W., MALE, born 1878, waiter, married. This patient has always been notorious by reason of the scantiness of his hair, and on few occasions has he ever shaved. As a youth he was somewhat over-fat, but after puberty this became less noteworthy. In 1898, at the age of 20, he contracted a " running " of which he took little notice and for which he was not treated. He married in 1907, and his wife has had one child, born in 1910, which survives and is healthy; she has had no miscarriages. He states that his general health has been fairly good except that he frequently suffered from attacks of severe headache, in the back of the neck and through the temples, until 1911. Early in the year 1911 he began to put on weight, and noticed that the deposits of fat had a somewhat unusual distribution, affecting the chest, shoulders, thighs and pubic regions. In the spring of the same year (1911), shortly after the development of the fatness, the attacks of headache became more severe and more frequent, and he began to complain of intense thirst accompanied by the passage of inordinately large quantities of urine. When he went to bed he always arranged to have a large jug filled with water close at hand. The quantity of urine passed at this time was never measured, but he estimates that the daily quantity would always be more than 4 pints and often as much as 6 pints. With the development of the polydipsia and the polyuria sleep became disturbed, and horrible dreams and nightmares kept him from sleeping. During the years 1911, 1912 and 1913 polydipsia and polyuria were troublesome, but the degree of thirst and the quantity of urine passed varied much from week to week. He now attended as an out-patient at a hospital, where his case was diagnosed as one of " diabetes insipidus," " the drinking diabetes without any sugar," and received medicinal treatment. In 1914 his health improved, but in the spring of 1915 he found difficulty in walking: his legs became stiff, would jump at night, and after any activity he would easily tire. Later his feet and hands began to swell. On a particular day in 1914 or 1915, he does not quite remember when, he noticed that he was blind of his left eye and was told that his left upper eyelid drooped. The blindness of the left eye persisted for two or three weeks and then some vision in this eye gradually returned, and he states that some three months after

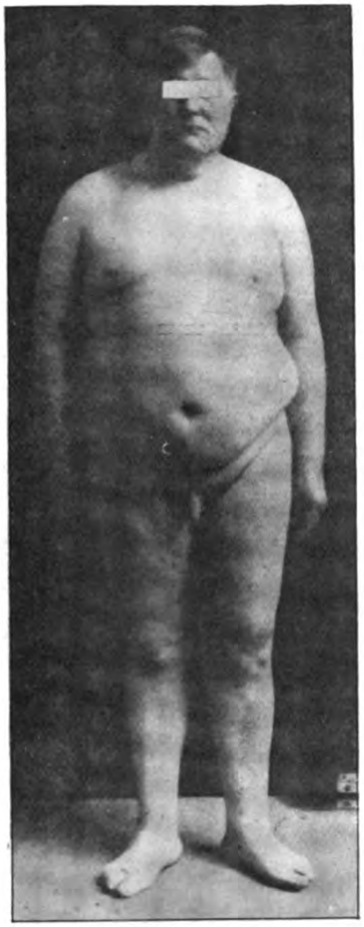


FIG. 1.

the onset vision with the two eyes again seemed perfect and his palpebral fissures were equal. Since the middle of 1915 he has complained of thirst, polyuria, adiposity, torpidity, and attacks of stupidity and difficulty in walking. The severity of the manifestations has varied from time to time. At the same time sexual desire has gradually diminished. He continued his work as a waiter until the middle of February, 1916, when, owing to his difficulty in getting about, he ceased work.

At the present time (March, 1916) the patient is a pale, sallow man, aged 38, with a "Napoleonic" appearance (fig. 1). The skin is soft and feminine. Axillary hair is almost completely absent and the pubic hairs are few, short and harsh. Subcutaneous fat is everywhere excessive in quantity, but over the regions of the breasts, lower abdomen, lumbar region and thighs the excess is greater than elsewhere. The general contour of the patient is characteristic of the "typus femininus" of Cushing's cases of hypopituitarism. The skin of the thighs and shins shows irregular mottlings. The skeleton is normally developed and X-ray examination of the epiphyses reveals no gross abnormalities. The penis is small and infantile and the scrotum and testes are small. Sexual desire is no longer present. The head is rather large, 22½ in. in circumference, bimeatal diameter 14¼ in. and nasion-inion distance 14½ in., but there is no further evidence of hydrocephalus. An X-ray of the sella turcica shows that the pituitary fossa has well-defined outlines (fig. 2). The interclinoid distance measures 11 mm. and the depth is 10 mm., and the sphenoidal sinus is large. The thyroid gland is small but can be palpated. In the heart, lungs, vessels, abdomen and urine no abnormal signs can be demonstrated. The urine tested on several occasions has shown a low specific gravity, 1002 to 1004, and has contained neither albumin nor sugar. The patient has measured the quantity and states that since the middle of February, 1916, the daily excretion has never fallen below 4 pints. The rate of the pulse tends to be low, 60 to 70. The temperature is subnormal, 97·6° F. to 98·6° F. The tolerance to carbohydrates has not been measured, but after taking 200 grm. of dextrose by mouth no glycosuria appeared. The voice in recent times has altered; he can no longer sing, and the speaking voice reminds one of a boy whose voice has just broken. The blood-pressure is 125 mm. The Wassermann reaction in the serum is positive; it has not yet been tested in the cerebrospinal fluid. Mentally he is slow but intelligent. The patient himself complains of drowsiness and somnolence, and states that he can no longer think, nor do those things of which he once was capable. Speech is slow and articulation deliberate. His wife says that he has become more "good-tempered" and less "in a hurry to do things," but at the same time he is annoyed because she notices that he has "changed in himself." He complains of basal headache, and pressure upon the occipital and temporal regions leads to a complaint of pain. Vomiting, nausea and fits are not complained of. He sleeps badly and at nights is restless. In bed his legs are "constantly drawing up and jumping." The left upper eyelid tends to droop: this tendency varies from day to day. The pupils are equal and react sluggishly to light and accommodation. The movements of the eyeballs are unaffected, and diplopia is not present. The face is flat and shows little expression. Movements of the tongue, palate and larynx are normal. He hears a watch readily at 10 in. with either ear. Smell and taste are unaffected. The visual fields are unimpaired; there is no temporal nor nasal hemianopsia. The edges of the left

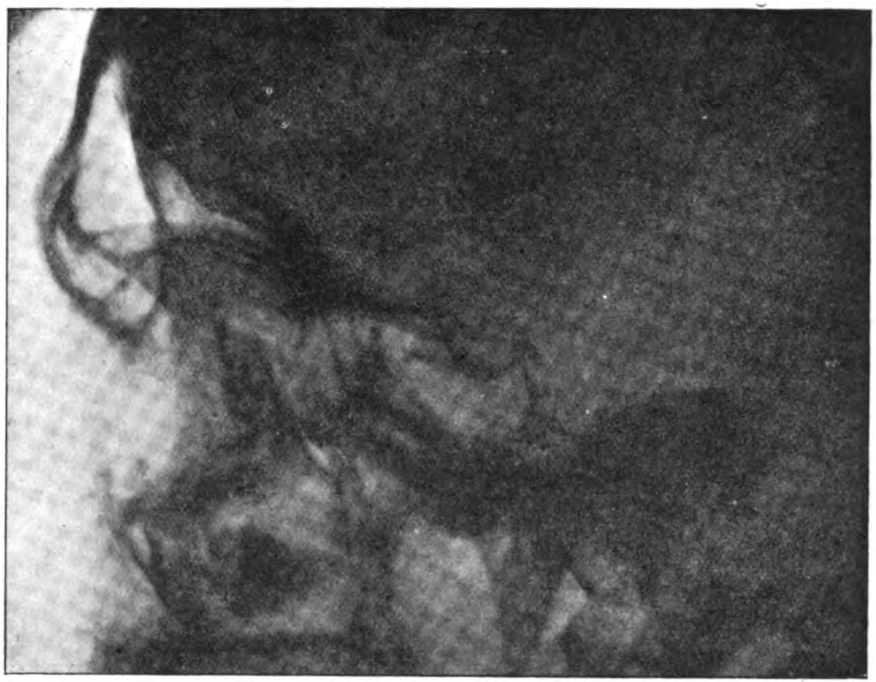


FIG. 2.

disk are indefinitely defined, the cup is filled in and the veins full; the arteries appear normal. The right disk has a more normal appearance. Both lower extremities are stiff and the toes tend to be pointed, with the development of slight talipes equino-varus. In walking he shuffles slowly and exhibits adductor spasm leading to a certain degree of scissoring of the knees. The knee-jerks are exaggerated, knee clonus is present but ankle clonus cannot be elicited. Both ankle-jerks are easily obtained. The plantar responses on both sides are extensor. Abdominal reflexes cannot be obtained. Wrist- and elbow-jerks are obtained. The action of the sphincters is controlled. No sensory interferences can be determined.

Dr. LEONARD GUTHRIE: The "Napoleonic facies" noticeable in Dr. Fearnsides' patient implies something more than a chance resemblance to Napoleon Bonaparte. The subjects of dystrophia adiposo-genitalis often show a family likeness to each other, and their features resemble those of Napoleon in his later years. The likeness is due to massiveness of the lower jaw and to maxillary prognathism, which Cushing has described as characteristic of hypopituitarism. The explanation of this curious resemblance is that Napoleon himself suffered from hypopituitarism towards the close of his life. This is clearly shown in Henry's description of the external appearance of Napoleon's body after death ("Illness and Death of Napoleon Bonaparte," by Arnold Chaplin, 1913). "The whole surface of the body was deeply covered with fat. Over the sternum, where generally the bone is very superficial, the fat was upwards of 1 in. deep, and 1½ in. to 2 in. on the abdomen." "There was scarcely any hair on the body, and that of the head was thin, fine, and silky." "The penis and testicles were very small, and the whole genital system seemed to exhibit a physical cause for the absence of sexual desire, and chastity which had been stated to have characterized the deceased." "The skin was noticed to be very white and delicate, as were the hands and arms." "Indeed, the whole body was slender and effeminate; . . . the pubis much resembled the mons veneris in women. The muscles of the chest were small, the shoulders were narrow and the hips wide." Napoleon's symptoms during the last three years of his life—increasing mental and physical lethargy, headache, and desire for warmth—described in full by Dr. Chaplin, are points in keeping with the existence of hypopituitarism; whilst certain conditions noted in his earlier life—namely, persistent bradycardia (pulse rarely above 50), frequency of micturition, epileptiform attacks characterized by vomiting, followed by somnolency, almost amounting to coma; abnormal "libido sexualis"—suggest dyspituitarism as the cause.[1]

---

[1] "Did Napoleon suffer from Hypopituitarism?" Leonard Guthrie, *Lancet*, September 13, 1913, p. 823.

(*February* 24, 1916.)

Case for Diagnosis.

By E. G. Fearnsides, M.D.

A. T., a boy, aged 15, noticed on February 5, 1915, some stiffness in the fingers of his right hand; this stiffness was progressive, and on February 8 he was unable to write or use the flexors of the fingers with any power, and he could not lift the right fingers; flexion and extension of the right wrist could be performed but were weak. On February 12 he was noticed to be limping and he complained of stiffness of the right knee. His previous health had been good. At birth it was observed that on the right foot he had only four toes, and some time later his mother thought that the right lower extremity was smaller than the left. No physical disability had ever been noticed in the upper or lower right extremities. He has acted as goalkeeper in the school football team. He has never had any acute illness outside ordinary children's ailments. No history of headache, vomiting, convulsions, or squint can be obtained.

Present condition: Right lower extremity smaller than left. Pes cavus; contraction of tendo Achillis; very limited power of extension at ankle-joint. Movements of right lower extremity less powerful than of left. Gait hemiplegic. Upper part of the right upper extremity smaller than the upper part of the left. Voluntary power of fingers is diminished, extension being feebler than flexion. All movements of right wrist, elbow, and shoulder weaker than those of the left side. Knee-jerks both exaggerated, about equal; both ankle-jerks brisk. Ankle clonus obtained on right, not obtained on left. Plantar response on right extensor and on left flexor. Wrist- and elbow-jerks brisk on both sides. Abdominals unaffected. Sensation and the action of the sphincters unaffected. Pupils equal, react normally to light and accommodation. Ocular movements good. Right upper motor facial weakness. Movements of palate and tongue normal. Optic disks and fundi healthy. Wassermann reaction in serum negative.

Postscript.—The boy was admitted as an in-patient at the Hampstead General Hospital, under the care of Dr. Sutherland, on

February 19, and by March 10 he could again use his right hand normally and carry out all actions with his right lower extremity; at the same time the right plantar response became of the flexor type and ankle clonus was no longer obtainable.

(*February* 24, 1916.)

? Cerebral Tumour.

By HUGH THURSFIELD, M.D.

A CARPENTER, aged 49, five years ago fell, from a ladder, a depth of 11 ft.; he was stunned, and kept in bed on account of bruises for fourteen days. No signs of fracture of the skull diagnosed at the time. Eight months later he began to suffer from attacks of giddiness and vomiting, coming on about once a month. In the last six months these have been increasing in frequency and severity, and in January, 1916, he fell while walking home, and was unconscious for a few minutes. There was nothing resembling a " fit." Since then he has been in bed with very severe headache, constant vomiting, and great giddiness. He has been deaf in the left ear for about six or seven years — i.e., before the fall.

Present condition: He has a certain amount of ataxia in his gait and slight uncertainty in the movements of his hands. There is no paralysis and no loss of sensation—tactile, thermal, or positional; but a slight degree of inaccuracy in localization. There is occasionally a slight nystagmus on looking to the left. Besides the vomiting, which is constant even in bed, and bears no relation to food, the chief symptom is a tendency to fall backwards when he closes his eyes. This is marked. There is no papillitis in either eye, and the visual fields are practically normal. The knee-jerks are both active, more so on the right side; the plantar reflexes are flexor and inconstant; ankle clonus is present in the right leg.

Opinions are desired as to the diagnosis and the treatment.

The PRESIDENT: I am of opinion that the symptoms are due to labyrinthine disease.

(*February* 24, 1916.)

Dr. COLLIER exhibited cases of:—

(1) Jargon-aphasia.

(2) Tremor resembling paralysis in a boy due to an organic cerebral lesion.

(*February* 24, 1916.)

Case of Spastic Paralysis in a Boy, aged 8.

By C. M. HINDS HOWELL, M.D.

H. L., AGED 8, has been under observation in the Orthopædic Department of St. Bartholomew's Hospital under Mr. Elmslie since 1908. He first attended hospital on account of pain in the back and weakness in the legs. There was slight lordosis of the lumbar spine. He was fitted with a poroplastic jacket, which gave relief from pain, and his legs are said to have gained strength. Later, the jacket was discarded, and the symptoms returned; another jacket again brought relief. Since 1912 there has been no return of pain in the back, but, on the whole, the condition of the legs has deteriorated. The mother states that her confinement was natural, and that the child, though somewhat backward (he did not walk till aged 3), appeared normal, and that the movements of the legs were free. There is nothing suggestive of syphilis in the history given by the mother. She has one other child, now aged 5, who is perfectly healthy. There have been no miscarriages.

The child is undersized, but the head is large, 21½ in. in circumference; the enlargement is chiefly in the posterior part of the cranium; the forehead does not at all suggest hydrocephalus. Intelligence is only fairly good at school; though the child appears bright, his memory is said to be poor. There have been headaches from time to time. The cranial nerves and optic disks are normal, as are the upper limbs. There is a well-marked lordosis of the lumbar spine, but no rigidity, the spine being perfectly flexible and movements quite free from pain. There is no psoas contraction. The X-rays show that there is no sign of caries in the vertebræ. The lower limbs are spastic, and there is considerable adductor spasm, but the power of the limbs is good. The child walks with a spastic, knock-knee gait. There is slight equinus of the left foot. Sensation is natural in all its forms. Reflexes: Upper extremities normal, abdominals absent; right knee-jerk brisk, left present, but much less pronounced; ankle-jerks present, but no clonus; plantar response extensor on either side.

The spastic condition is clearly cerebral, and not due to any spinal lesion; the first appearance of spasticity at the age of 4, and the variations in its extent which have taken place under observation, make it unlikely that the condition is due to an ordinary diplegia. Dr. Guthrie thought that the size of the child's head, taken in conjunction with the clinical course of the case, especially with the variation in the condition of the lower limbs, makes the diagnosis of hydrocephalus probable.

Neurological Section.[1]

President — Dr. JAMES TAYLOR.

(*March* 30, 1916.)

Case for Diagnosis.

By JAMES TAYLOR, M.D.

J. S., MALE, aged 34, carpenter, was admitted on October 2, 1915. Five years ago he was suddenly taken ill; there were general weakness, fever, and "inflammation of the bowels," together with constipation for nine days. Some days later his doctor noticed that he was paralysed down the left side and that the face was drawn over to the left. The left pupil became widely dilated. In six months the arm improved, though the leg remained weak. He has not been able to walk since the illness, and during the last two years he has become much worse. The legs are completely powerless, and hands and arms very weak. The legs sometimes shake and the hands are drawn up, the elbow becoming flexed involuntarily. There is no visual trouble nor sphincter disturbance. At present there is complete paraplegia with spasticity, increased reflexes, and double extensor responses. There is no sensory loss, pupils are noticeably unequal, and the expression marked. No intention tremor nor changes in the disk. Wassermann reaction in blood and cerebrospinal fluid negative.

---

[1] Clinical meeting, held at the National Hospital, Queen Square, Bloomsbury.

(*March* 30, 1916.)

Case for Diagnosis.

By JAMES TAYLOR, M.D.

P. O'M., MALE, aged 40, admitted December 23, 1915. Patient is nearly blind. At the age of 19 he had syphilis; at the age of 22 he first noticed a blurring of the left eye; this has been steadily progressing. Eighteen months ago a similar "blurring" began in the right eye, and loss of vision has progressed so rapidly that he has been unable to see for about a year. In January, 1915, he had an epileptic seizure, and at that time he dislocated his shoulder. In December, 1915, he had four similar seizures.

At present he can distinguish outlines and shadows. There is a tendency to dislocation of the right shoulder; this occurs during fits, of which he has had seven since admission. At times he suffers from slight headache; there is a feeling of numbness over various parts of the body, including the left arm, left leg, and both feet. Numbness is not constant. Knee-jerks present and equal. Plantar response flexor. There is very steep-edged swelling of right optic disk, 7D. swelling. Veins very tortuous. Disk opaque and white-looking. Left optic disk shows 3D. swelling.

(*March* 30, 1916.)

Case of Hysteria.

By J. S. RISIEN RUSSELL, M.D.

C. C., FEMALE, aged 23. Admitted February 29, 1916.

October, 1913: Sudden pain in the right side of the head, paroxysmal, and accompanied by vomiting. Since July, 1915, pain has been continuous, severe in frontal region, and extending down the occipital region to the spine. The vomiting has become more frequent.

June, 1915: Weakness of the left arm began, also right-sided facial weakness. At Christmas, 1914, there was a convulsive fit, another in June, 1915, and a third in September, 1915, while an in-patient at the Manchester Royal Hospital. Patient cannot describe the fits, but says she fell to the left side and pulled out handfuls of hair from the right side of her head. Retention of urine occurs whenever the pain is bad.

On admission she appeared in great pain, and when moved lapsed into a state of semi-consciousness. When she came out of this condition she breathed heavily and perspired. She lay on her left side and moaned. Vision: Right $\frac{6}{60}$, left $\frac{6}{60}$. Disks: No optic neuritis. Taste and smell diminished on right side. Right-sided facial weakness which disappeared on emotion. Tongue protruded to left, no wasting. Motor system: Unable to sit up in bed; weakness of left arm with poor grip; no wasting or spasticity; no weakness of left leg. Sensory: Relative sensory loss over right half of body. Reflexes: Knee-jerks exaggerated; ankle-jerks present and equal; arm-jerks present and equal; abdominal reflexes all present; plantar reflexes flexor.

Retention of urine was complete for ten days after admission. Right-sided facial weakness and protrusion of tongue to left remain. Headache less severe; no fits. Vision at present time: In right eye $\frac{6}{18}$, in left eye $\frac{6}{18}$.

(*March* 30, 1916.)

Median Nerve Injury; Causalgia; Alcohol Injections.

By LEWIS R. YEALLAND.

(Introduced by W. A. TURNER, M.D.)

T. C., MALE, aged 45. In July, 1915, while in trench patient received shrapnel wound of right forearm; entry and exit just below the condyles. Pain came on in the palm of the hand immediately after injury and was burning in character. An alcoholic injection into the median nerve was made; pain was not relieved, but anæsthesia was present from the wrist downwards.

February 29, 1916: Another median injection was made; the nerve was exposed by Mr. Armour, and 10 minims of alcohol 90 per cent. was injected by Dr. Buzzard. There was a median loss of sensation, but slight median power was retained. Patient has not complained of pain since the last operation.

Electrical reactions show reaction of degeneration in muscles supplied by median nerve, and partial reaction of degeneration in those supplied by ulnar nerve.

(*March* 30, 1916.)

Case of Muscular Atrophy.

By F. E. BATTEN, M.D.

PRIVATE C., aged 29. Admitted March 25, 1916. At the end of January, 1916, patient dropped a box weighing 1½ cwt. on left forearm. Three days later he noticed his wrist was weak, and that he could not grip his rifle. The whole arm and shoulder gradually became weak. He has improved in power during the last few weeks.

Present state: General wasting of whole of left arm; no wasting of hand. Wasting of right and left spinati. Weakness of serratus magnus, with winging of scapulæ R. < L. No wasting of pectorals. Marked weakness of extensors of wrist and triceps in left arm. Only fair power in biceps, deltoid, and latissimus dorsi. No weakness in upper part of trapezius. Right grip 90, left 15. No wasting nor loss of power in lower limbs. All reflexes present, not exaggerated. Plantars flexor.

(*March* 30, 1916.)

Case of Muscular Atrophy.

By F. E. BATTEN, M.D.

PRIVATE H., aged 26. Admitted March 25, 1916. Pain in right arm (biceps and deltoid region) began three days after being wounded in calf of left leg. December 7, 1915: Arm felt weak. In February, 1916, pain in left arm which extended to the posterior scapular region, and power in shoulder became poor. No previous illness.

Present condition: Both grips poor: Right 100, left 106. No wasting in right hand or forearm. Right deltoid, biceps, triceps, supra- and infra-spinatus slightly wasted and somewhat weak. Serratus magnus most affected; winged scapula marked. Trapezius, pectorals, and latissimus dorsi unaffected. Left hand shows slight wasting of thenar eminence. No sensory loss. All jerks very brisk; abdominals present; plantars flexor.

(*March* 30, 1916.)

Paraplegia following Cerebrospinal Meningitis; Laminectomy.

By F. E. BATTEN, M.D.

G. H., MALE, aged 31. Admitted on December 7, 1915.

In April, 1915, was admitted to Plaistow Fever Hospital with cerebrospinal meningitis. Discharged after three months very weak, but was able to stand and walk fairly well.

In October, 1915, the legs gradually became weaker and made uncontrollable jerky movements. There was some loss of sensation and of sphincter control. No pain.

On admission: Both legs spastic; no power in ankles; other movements very weak. Some loss of sensation (not complete) to level of fourth dorsal segment. Knee-jerks much exaggerated, ankle clonus present, plantar reflexes extensor and abdominals absent. No fluid could be obtained by lumbar puncture.

January 12: Operation. Some opacity and thickening of membranes found at the level of the third dorsal segment. No definite cyst.

Since the operation the power in the legs has gradually returned. There is no sphincter trouble.

(*March* 30, 1916.)

Case of Ataxia in a Child.

By F. E. BATTEN, M.D.

J. I., MALE, aged 3, the seventh of seven children; the first five died. Well up to three months ago; since then less and less able to walk; increasing unsteadiness. Diminishing power of talking; no headache, no vomiting.

Present condition: Fat boy, with red face, large head, open fontanelle, depressed nares. Talks loudly in a hoarse, deep, bass voice. Pupils react; optic neuritis present, greater on right than on left side. A general tremor of body, slight ataxia of hand, marked ataxia of legs. Knee-jerks increased, no ankle clonus, plantars extensor. Gait wildly ataxic, tends to fall back. Muscular power good; hypotonic condition of muscles. Cerebrospinal fluid clear, 0·06 per cent. of albumin, no cells; Wassermann reaction negative. X-rays show no enlargement of sella.

Under observation six weeks. Optic neuritis less marked; ataxia also less in degree.

(*March* 30, 1916.)

Case for Diagnosis: Syringomyelia or Disseminated Sclerosis (?)

By S. A. K. WILSON, M.D.

PATIENT, a female. Illness began with pain in the left shoulder, which continued for about fourteen days. About the same time the left arm became weak, and this weakness has continued and progressed. Shortly afterwards it was noticed that the right leg and right side of body were numb. There have been no ocular symptoms and no sphincter disturbance. Since the onset of the illness the symptoms have undoubtedly varied somewhat.

Condition on admission: Pupils react, optic disks normal, no nystagmus.. Motor: Slight weakness of left arm and also of the legs, the left rather more than the right. Inco-ordination of arms in the finger-nose test, especially of left side. Possibly slight commencing wasting of the small muscles of the hands. Sensory: Numbness of right side of the body, occasional paræsthesiæ in left hand and foot. Apparently no definite impairment of tactile sensibility at present. Analgesia of the right leg and trunk to above the level of D4. In various places on that side a pin-prick "feels like a piece of ice." Also some diminution of painful stimuli over left side of face. Has cut right hand without noticing any pain. Thermal stimuli (both hot and cold) are very badly appreciated over whole of right side to level of nipple, and also over left leg below the knee. Here the cold tube is usually appreciated while the hot tube is not. Has burned her right hand without feeling any pain. Can put her right hand into "boiling water" "without feeling it." There is complete astereognosis and loss of sense of position and passive movements of left hand. Reflexes: Exaggeration of deep reflexes in arms and legs; extensor response on left side and probably also on right side.

(*March* 30, 1916.)

Lesion of Right Optic Thalamus and Regio Subthalamica.

By S. A. K. WILSON, M.D.

E. A., MALE, aged 59.

November, 1911: Left hemiplegia with sudden onset, and without loss of consciousness. Two days later there were paræsthesiæ in left arm and leg, and scalding sensation, beginning in left face and spreading to left arm and leg. Since the attack there has been gradual improvement in hemiplegia, but involuntary movements developed two months after the onset, and these, with the sensory changes, remain more or less constant.

Condition on admission: Motor—Slight left hemiplegia, with increased tendon reflexes and an inconstant plantar extensor reflex on left side. Almost constant involuntary movements of left arm occur; these are mainly of the nature of an irregular tremor. The hand also frequently assumes an athetoid attitude. Under the influence of various stimuli, particularly if unexpected, applied to the left arm, or under the influence of emotion, the involuntary movements spread over the whole left side, with the exception of the face. In addition, the irregular tremor referred to above appears in the arm and leg, affecting particularly their peripheral segments, the proximal segments of the limb for the time being becoming immobilized in a spasm, which is not unlike what occurs in "hemitonia apoplectica." This spasm varies remarkably; at times the limbs become flaccid; sometimes a condition of tonic perseveration occurs in the left hand, the patient being unable to relax his grasp on request. There is no incoordination. Sensory system — Marked paræsthesiæ on left side. Tactile sensation slightly diminished over left face, and doubtfully so on the trunk and arm. Analgesia exists to a considerable extent over the whole of the left side, but occasionally a pin-prick, more especially on the face, produces marked over-reaction. Painful stimuli applied over the left side of the abdomen, when they are appreciated, radiate widely and are felt as scratches. Thermal stimuli are very poorly appreciated over the whole of the left side, but occasionally, noticeably in the left forearm, there is marked over-reaction, the cold tube applied being sometimes described as a "burning stab." There is diminution in the appreciation of passive movement in the periphery of the left arm and leg.

Neurological Section.

President—Dr. JAMES TAYLOR.

(*May* 25, 1916.)

Two Cases of Post-central Injury of Cortex, shown for the purpose of eliciting evidence on—(i) the Appreciation of Vibration, (ii) Recovery, (iii) Segmental Representation on the Cortex.

By F. E. BATTEN, M.D.

CASE I.

J. M., AGED 23. History: Wounded at Ypres on April 25, 1915, in the left parietal region. Right hemiplegia. Two pieces of shrapnel localized by X-rays and removed from brain. General condition improved, but hemiplegia stationary.

May 28: Jacksonian fit, beginning with twitching in the right thumb, and spreading to hand, arm, shoulder, and right side of mouth. No loss of consciousness. Temporary aphasia.

June 6: Similar but slighter attack.

June 10: ½ oz. pus evacuated from wound, which had healed on the surface.

October 4: Still a sinus. No improvement in general condition.

October 11: Admitted to National Hospital. Spastic right hemiplegia; arm more affected than leg; unable to stand or walk. Sensory loss: No loss to touch, pain, temperature, deep pressure, or vibration. In right hand complete astereognosis, and some loss of sense of position and passive movement, greater over the ring and little fingers than over the index and middle fingers. Discrimination of compass-points is very much down, more so over the ulnar than radial border of the hand. Localization: No defect. In the right foot sense of passive movement and sense of position very much impaired. Deep reflexes exaggerated on right side; right plantar extensor.

November 5: More bone removed from wound; dura not opened.

December 13: Slight Jacksonian attack; no loss of consciousness.

March 15, 1916: General condition much improved; walks well with celluloid splint on right leg; sensory changes in right hand and foot as on admission.

CASE II.

J. G. F., aged 37.

March 13, 1916: Wounded by rifle bullet in left parietal region; immediate paralysis of right arm and leg with aphasia; no loss of consciousness (was wearing a steel helmet).

April 4: Admitted to the National Hospital. On admission: Septic gutter wound 4 in. long on left side of head, running antero-posteriorly 2 in. from mid-line. No optic neuritis, no hemianopia. Aphasia: Not complete. Right hemiplegia: Face, arm, and leg affected; right hand completely paralysed and flaccid; arm spastic, leg slightly spastic; deep reflexes increased; right plantar response extensor; right abdominal reflexes down. Sensory loss: No loss to touch, pain, temperature, vibration, or pressure pain. Right hand: Complete astereognosis and loss of sense of position; localization and discrimination very much down; sense of passive movement impaired; the loss is not greater on the ulnar than radial side of the hand. There is no loss of sense of position, localization, or discrimination in right foot.

May 5: Hemiplegia and aphasia improved; still astereognosis, with loss of sense of position, passive movement, localization and discrimination.

Dr. HARRY CAMPBELL: May I call attention to the fact that the cutaneous area especially involved in stereognosis is that supplied by the median in the hand, for in feeling a small object with one hand the thumb is opposed to the first and second fingers and to the radial side of the ring-finger? The associated cortical area has a correspondingly high psychic value. It is interesting to note in this connexion that pain and vasomotor and trophic disturbances are more pronounced in injury of the median nerve than of either the ulnar or musculo-spiral.

(*May* 25, 1916.)

The "Pudding Face" Type of Dyspituitarism (?).

By E. G. Fearnsides, M.D.

V. O., FEMALE, born October, 1898. The patient is the second of two children; her sister, born January, 1897, who is of normal size and proportions, started to menstruate when aged 14½. Her father and mother, aged 54 and 52 respectively, are of ordinary size and healthy. As a baby she was always "large" but normally proportioned. At the age of 7 she suffered an attack of scarlet fever; after this attack she began to get stout. A photograph taken at the age of 4 shows the patient with a round face but otherwise normal, whilst one taken when she was in Standard II, about 1906, shows that she was then already noticeably and abnormally obese. When in Standard IV the severity of this obesity had increased, and the photograph taken in 1910, when she was in Standard VI, proves that at that time she had a double chin. In 1912 she was grossly out of proportion, but her neck and trunk were not so severely affected as they are at the present time. She left school in 1912, having reached Standard VIIx, and since that time has worked at a book factory. In 1913 she weighed 13 st. 12½ lb., and measured 4 ft. 3 in. in height. She has never menstruated. On April 21, 1916, she slipped when getting off a tram, fractured her right patella, and was admitted to the London Hospital under the care of Mr. Jonathan Hutchinson.

Since 1905 her general health has been good; she has never been laid up with any illness. Her only complaints are of "her appearance" and occasional attacks of frontal headache, which "take me off my food and make me feel sick," and some shortness of breath on slight exertion.

At the present time she weighs 13 st. 9½ lb. She wears boots size 4 and gloves 6¼, and before admission stays 48. Her head is of normal dimensions, measuring 22 in. in circumference, 13¾ in. from nasion to inion, and 13¾ in. between the meatus. The hair of the scalp grows very slowly, is scurfy, curly, scanty, and harsh. On the moustache and beard region is a copious growth of stiff dark hair, and over the front of her chest is a considerable hirsutic development. The nails both on the hands and feet are little affected. There is no excessive pigmentation of the skin or on the mucous membranes. The skin generally is dry, and epithelium tends to be heaped up on it. The skin of the extremities is blue or mottled and sweats little, but the patient complains of excessive sweating in the axillæ and groins. In the folds of the fat-covered abdomen intertrigo is troublesome, and from time to time she has suffered from follicular infection of the skin of her trunk. For a girl of her height the upper extremities below the elbows and the lower extremities below the knees are of normal proportions. The oral cavity and pharynx appear of normal size. The cheeks are of high colour, rounded and prominent. Under the chin is an enormous deposit of loose, soft fat. Viewed from behind she presents the appearance of an extremely obese old woman, whilst her chest is barrel-shaped. The breasts are of masculine type, with small flat nipples. The whole chest, however, is covered with a great excess of fat. The abdomen is extremely adipose, and its walls are thrown into large folds such as are so commonly seen in grossly adipose old women. The fat of the abdominal wall is most excessive over the suprapubic region, which hangs down over the small and ill-developed female external genitalia. The thyroid gland cannot be palpated. In the heart, lungs, abdomen, and urine no abnormal signs can be determined. The vessels are not thickened, and the blood-pressure is not raised. The diurnal quantity of urine measures about 45 oz., its specific gravity ranges from 1018 to 1022, and after the administration of 100 grm. of glucose by the mouth no sugar appeared in the urine. The voice is still girlish; she can sing well, and is a member of a prize choir which competes regularly at the Crystal Palace. On the average she is contented and good-tempered, learns easily, and is fairly good at her work. Torpidity, drowsiness, and psychic disturbances have never been noteworthy. The ocular movements are unimpaired, and ptosis has never been noticed. Vision is good, and the optic disks and fundi appear normal. Smell is unaffected, and hearing is good. The cranial nerves function normally. Gait is unaffected, and all movements can be well and powerfully performed. Rombergism is not present. No sensory interferences can be demonstrated. Both knee-jerks are extremely glib, and ankle clonus can be easily elicited on both sides. The plantar responses are difficult to obtain, but appear to be of flexor type. Abdominal reflexes cannot be obtained. Wrist- and elbow-jerks are not exaggerated.

An X-ray of the sella turcica shows a small ovoid pituitary fossa 10 mm. in greatest diameter, 9 mm. in depth, with a very narrow neck, showing an opening measuring less than 2 mm., surrounded by well-developed and opaque bone.

Dr. F. **Parkes Weber**: If Dr. Fearnsides' case is really one of dyspituitarism, I think that the relative hairiness (hirsuties) of the patient is a most remarkable and exceptional feature. Nevertheless, an American writer has recently described a symptom-complex under the term "pilous cerebral adiposity,"[1] which he regards as a hairy type of hypophyseal disease. In Dr. Fearnsides' case, however, the peculiar plethoric, "coarse" type of "precocious obesity," associated with abnormal growth of hair, suggests the presence of suprarenal tumour of the "hypernephroma" kind. It is noteworthy that girls affected with such tumours have sometimes, like Dr. Fearnsides' patient, presented secondary sexual characters approximating to those of the male.

(*May* 25, 1916.)

Amyotrophic Lateral Sclerosis in a Man, aged 28, showing Chvostek's Sign.

By Leonard Guthrie, M.D., and E. G. Fearnsides, M.D.

H. H., male, born 1888, single, clerk. The patient is the eldest of five healthy children. He entered the Civil Service as a boy clerk at the age of 16, and until May, 1915, had suffered no serious illness. In this month he began to feel "run down," easily tired, and "not quite himself"; he attributed his condition at that time to the fact that he was working hard all day at the office, and in the evenings was running a troop of Boy Scouts. Within a few weeks, however, the weakness, which before had been general, seemed to settle in the left arm and shoulder. In August, 1915, he took a holiday and ran a summer camp; his general condition improved considerably, but on his return he found that his left upper extremity had wasted noticeably. In September local weakness of the right upper extremity developed, and he found that after a day's work both legs would ache and drag. During the whole of this time he had suffered neither fever nor pain. In September, 1915, he attended as an out-patient at the National Hospital under the care of Dr. James Collier, but despite treatment the weakness and wasting progressed. He first attended at the Maida Vale Hospital under the care of one of us in December, 1915, and was admitted an in-patient in April, 1916; since he first came under observation the muscular wasting and weakness have increased. In March, 1916, the voice became nasal, and about this time he began to suffer from drawings up of the legs.

---

[1] W. M. Kraus, *Amer. Journ. Med. Sci.*, Philad., 1915, cxlix, p. 737.

Present condition: Both knee-jerks are exaggerated, and ankle clonus is readily obtained. On each side the plantar reflex gives an extensor response. The abdominal reflexes are abolished. The wrist- and elbow-jerks are extremely brisk, and percussion over the long extensor tendons of the fingers leads to a brisk contraction. The jaw-jerk is extremely brisk. A slight tap in the course of the facial nerve throws the facial muscles into contraction (Chvostek's sign). No interferences with sensation or with the trophic functions can be demonstrated and the patient suffers no pain. The action of the sphincters is little affected. The pupils are of average size and react briskly to light and accommodation. Diplopia and ptosis are absent, and there is no nystagmus. The facial muscles act feebly but symmetrically. The voice is faint and nasal in tone. The palate acts badly. Swallowing of dry, solid foods is difficult but with fluids he has never experienced any difficulty. The tongue is well developed, is protruded straight, but cannot be held steady. Vision is good, and the optic disks and fundi appear natural. Smell, taste, and hearing are not affected. He cannot feed himself because he cannot raise his hands to his mouth, neither can he raise his head from a pillow, nor get up from a lying into a sitting posture. All the muscles of the lower extremities are wasted to a considerable extent, the calves being proportionately most affected. The muscles moving the shoulder-girdle and its appendages are grossly wasted and extremely feeble in power. The sternomastoids and diaphragm are little affected. Wassermann reaction in serum negative.

Dr. E. G. FEARNSIDES: The sign of irritability of the facial nerve was first described by Chvostek in cases of tetany, but as to its mode of production in that diseased state nothing certain is known. In tetany certainly all reflex phenomena are exaggerated, and probably the appearance of Chvostek's sign in that disease is dependent upon the condition of the central nervous system. The mechanism of the production of the sign therefore would be comparable with that of a tendon reflex. When Chvostek's sign is found in cases of cerebral diplegia of infancy or of amyotrophic lateral sclerosis, this explanation of its mode of production would appear to be correct.

(*May* 25, 1916.)

Sclerodermia with Subcutaneous Calcareous Concretions.

By E. G. FEARNSIDES, M.D.

E. M. D., FEMALE, single, born 1874. Since childhood this patient has always complained of "hands of ugly shape, which were always difficult to keep nice, quite different from those of her sister," but until about Christmas, 1913, these were not really disabling. She used to wear gloves size 7, could play the piano and do needlework. In December, 1913, she first noticed that her hands were constantly either "blue and numb" or "white and cold," and about the same time began to complain of "cold feet." Previously she had never suffered from defective circulation in the extremities nor from chilblains. Towards the end of the same winter the hands began to swell and she began to suffer from pains in the joints of her extremities, which now grated on movement. Gradually the swelling of her hands increased, but it varied in amount from time to time though never entirely disappearing.

About January, 1915, in addition to the troubles with her extremities there was abdominal discomfort, not related either to the intake of food or the condition of the bowels, and unaffected by dieting; the pain usually came on in the afternoon and was always worse when she was tired. In April, 1915, she suffered from an attack of "arthritis" in which she complained of pains affecting both shoulders, the chest, the knees and the ankles. The attack passed off slowly and left her subject to indefinitely localized aches in many parts and occasional lancinating pains in her extremities. In July, 1915, she started a course of treatment with thyroid extract and continued this until November, 1915, with little apparent improvement either in the condition of the hands and feet, or relief from the twinges of acral pains or from the abdominal discomfort. Early in December, 1915, the pains in the extremities became more severe, then the right great toe-joint swelled considerably and the right knee and right hip became intensely painful on movement. The right knee and great toe-joints then became hot and red, and presented an appearance like acute gout. The temperature rose to 99·4° F. Later the pain became most severe about the hip and groin and was very intense; morphia was required to allow of sleep. During this attack small subcutaneous nodules were discovered, apparently attached to the capsules of the joints, over the fronts of both knees and on the elbows, with a small (?) tophus on the left ear. The acute attack lasted about fourteen days and the patient remained in bed for twenty-one days. During the attack the cardiac action was normal and albuminuria was not present. After this attack the patient noticed that her face had altered, " the skin becoming red, rough and blotchy." Since this time the pains have been less intense, but recently she has suffered from much severe discomfort localized to the middle line of the lower neck and upper chest. She describes the pains as " unbearable, shooting, forcing and generally upsetting," and at the present time locates them in the joints of the extremities, in the region of the lower cervical and upper thoracic vertebræ and in the abdomen. During the whole course of the illness menstruation has not been affected, and no changes have been observed in the bones of the cranium or jaws.

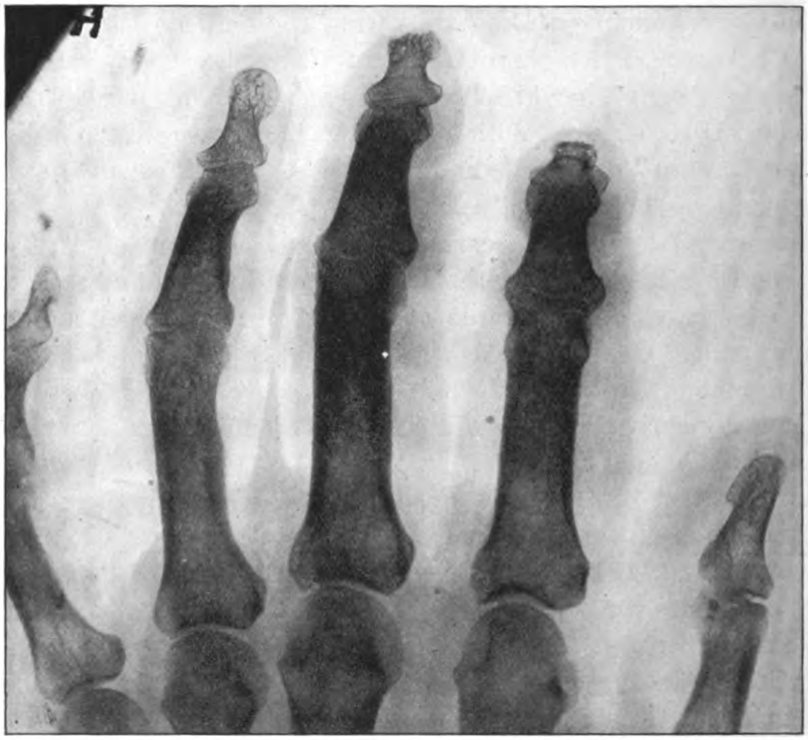


FIG. 1.

Case of sclerodermia with subcutaneous calcareous concretions. Skiagram of right hand.

The patient is a well-covered, well-developed woman, aged 42, who does not look more than her age. In the urine, heart, vessels, abdomen and lungs no abnormal signs are present. The thyroid can be felt. The voice is normal. There is no excessive pigmentation. She sleeps well and no alteration in mental state or general ability has taken place. Vision is unimpaired and the visual fields and optic disks and fundi are unaffected. In the territory of the cranial nerves and amongst the reflexes no abnormalities are present. Sensation is little affected even on the extremities and the musculature is normally developed. Sphincter action is unaffected. The skin of the face is red, rough, and shows numerous papules and some dilated vessels; elsewhere the skin is harsh and dry. There is no excess of subcutaneous or other adipose tissue. The architecture of the cranial vault and facial apparatus is not affected. X-ray examination of the sella turcica shows a well-developed

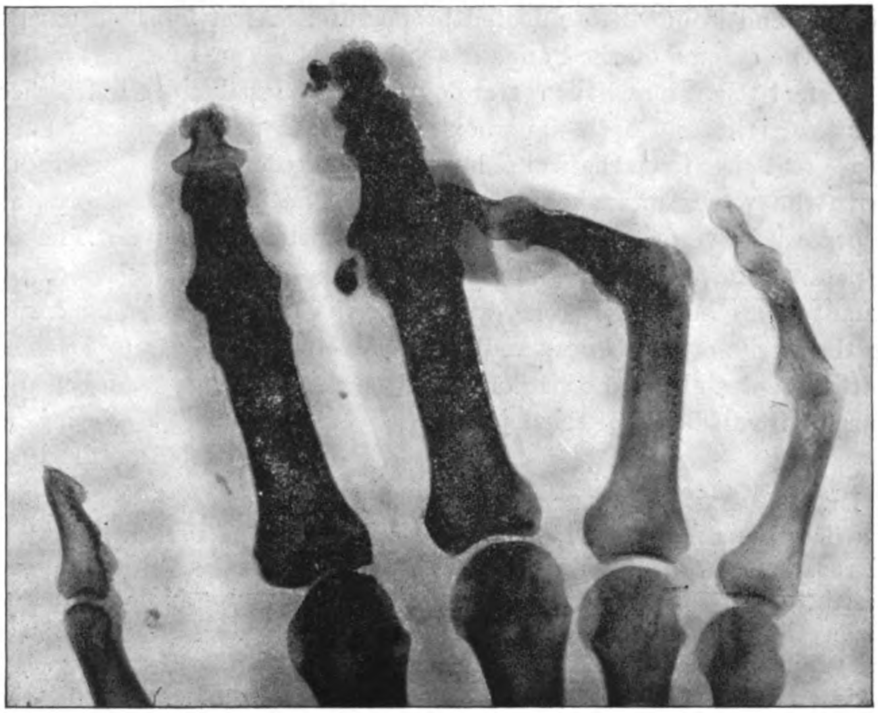


FIG. 2.

Case of sclerodermia with subcutaneous calcareous concretions. Skiagram of left hand.

pituitary fossa measuring 15 mm. in greatest diameter, 10 mm. in depth, and with normal clinoid processes. In the skiagram of the hands at the bases of proximal phalanges of the thumbs "tophaceous" deposits are seen. The ungual phalanges of all the digits of both hands and both feet are rarefied and show loss of bony substance. In the middle phalanx of the left ring-finger are some nodules which are opaque to the X-rays. Both hands and both feet show a severe amount of chronic infiltration of the skin leading to gross deformity of the extremities; this œdema is apparently of a solid nature, for it does not pit upon pressure and is but little affected by posture. After fourteen days' rest in bed the œdema of the hands has subsided to a small extent and that of the feet to a somewhat greater degree. The left hand is more affected than the right, and both upper extremities are proportionately affected to a greater extent than the lower. The œdema ends off gradually above the wrists and above the ankles. The joints of the extremities all grate upon movement, but they exhibit little deformity. The range of passive movement at the affected joints is little restricted. The patient holds her trunk stiffly and tends to carry her head far forward. On the fronts of both knees and about the elbows are a number of hard, shotty nodules about the size of a split pea, apparently attached to the capsular investments of these joints.

Dr. F. PARKES WEBER: Dr. Fearnsides' case is evidently similar to that of a lady described by Dr. Scholefield and myself in 1911 as a "Case of Sclerodactylia with Subcutaneous Calcareous Concretions."[1] To the same class belong the cases described by Dr. W. K. Hunter in 1913 under the heading "Sclerodermia with Subcutaneous Calcareous Deposits,"[2] and the case exhibited before the Dermatological Section of this Society by Dr. Haldin Davis as "Raynaud's Disease associated with Calcareous Degeneration."[3] The cases, however, which have been described as "trophœdema" belong to quite a different group.

In Dr. Fearnsides' case the skiagrams of the hands, showing partial absorption of the terminal phalangeal bones and deposition of calcium salts in the soft parts in at least one of the fingers, are very characteristic. In the case described by Dr. Scholefield and myself some of the chalky deposit was chemically analysed and was found to consist (as in cases published on the Continent) of a mixture of calcium carbonate and calcium phosphate. Similar cases have been termed "chalk-gout" or "calcareous gout" (German, "Kalk-Gicht"), and have even been mistaken for genuine tophaceous gout. The deposits occur in a spongy meshwork of connective tissue, and when ulceration takes place they may be discharged in the form of gritty particles or as a milk-like emulsion of calcium salts. The association of absorption of bone salts from the terminal phalanges with the formation of calcareous concretions in the soft parts reminds one of Virchow's writings on "metastasis of lime-salts" in certain diseases ("Kalkmetastase"). The discharge of calcareous deposits (by thinning and ulceration of the soft parts covering them) has in some cases (similar to Dr. Fearnsides' case, but at a later stage) led to troublesome, very chronic and indolent ulceration; and death has even been known to result from septic complications.

---

[1] Scholefield and Weber, *Brit. Journ. Derm.*, Lond., 1911, xxiii, p. 276; *see* also *Proc. Roy. Soc. Med.*, 1912, v (Derm. Sect.), p. 124.

[2] W. K. Hunter, *Glasgow Med. Journ.*, 1913, lxxix, p. 241.

[3] Haldin Davis, *Proc. Roy. Soc. Med.*, 1912, v (Derm. Sect.), p. 99.

Next to the fingers and toes, the most frequent sites of the disease are probably the elbows (about the olecranon) and the knees (about the patella), both of which situations are affected in Dr. Fearnsides' case. In his case the little nodules over the knee-cap almost certainly contain calcareous deposits; they are covered by red skin, though, like rheumatic nodules, they are neither firmly adherent to the skin nor to the periosteum. In a paper in 1913 on the case of a child with more extensive calcareous deposits, but without any sclerodermatous changes,[1] I have given references to the literature of the subject up to 1913, but various publications have appeared since then.

(*May* 25, 1916.)

Bilateral Ptosis and Ophthalmoplegia Externa, with other Symptoms, for Diagnosis.

By F. S. PALMER, M.D.

E. S., MALE, aged 10, an only child, first came under observation on December 7, 1915, complaining of headaches, diplopia, and drooping of both eyelids of five or six months' duration. His father died two and a half years ago from pneumonia. His mother is not robust; she suffers from rheumatoid pains and nervousness, but has not had any serious illness.

The boy had whooping-cough two and a half years ago, but has, so far, escaped all the other ordinary ailments of childhood. For the last four or five years he has suffered from severe migrainous attacks, not limited to one side of the head, and usually terminating by vomiting. His school reports have always been satisfactory, and his intelligence is good. There is no history of fits. His height is 4 ft. 9 in.; weight, 5 st. 13 lb. Three weeks before the present illness commenced (June, 1915) he slipped on the steps of the local railway station and fell backwards, striking the back of his head close to the lambdoid suture. There was no loss of consciousness at the time, nor any vomiting afterwards. He got up without assistance and walked home. The next morning he seemed very little the worse for the accident, with the exception of a small bump on the head. Three weeks later, after a severe attack of migraine, his mother noticed, when he was eating his dinner, that he was looking on one side of the plate, and, to use her own words, "that his left eye had gone into the outer corner." Two or three days afterwards she observed that his right eye became similarly affected. He was then placed under the care of his usual doctor, and in July last he was taken to see Mr. Jessop for the strabismus.

---

[1] F. P. Weber, "Subcutaneous Calcinosis," *XVIIth Internat. Congress of Med.*, Lond., 1913, Sect. XIII, ii, p. 179.

The following notes were made on December 7, 1915: The appearance of the boy strongly resembles that seen in the Landouzy-Dejerine type of myopathy. His face is mask-like, mouth open, and of the tapir shape. He has a marked degree of bilateral ptosis, not much altered by bringing the frontalis into action, exophthalmos, and complete ophthalmoplegia externa. The eyes cannot be moved in any direction by the ocular muscles. There are no nystagmoid movements. His pupils are equal, widely dilated, but act slightly to the stimulus of an electric torch. He still complains of occasional diplopia. His vision is $\frac{6}{6}$ in the right eye and $\frac{6}{9}$ in the left. Both disks are pale, the vessels look small, but the outlines are sharply defined. There is some weakness of the lower facials; he can whistle a few notes, but not any tune. His voice is quite natural, without nasal intonation, and he has no dysarthria or dysphagia. He reads well, and his tongue is protruded easily and in the middle line. The thyroid is not enlarged, and there is no kind of tremor. His heart sounds are normal; pulse-rate 110. There is wasting in some of the muscles of the shoulder-girdles, especially marked in the deltoids and spinati. No sensory disturbances can be detected on careful testing. His mother says he is easily fatigued after exertion, but his gait is normal, and there is no Rombergism nor lordosis. The urine is acid; specific gravity, 1025; no albumin nor sugar. Reflexes: All deep tendon reflexes are increased, but his knee-jerks are not diminished by repeated tapping ; no ankle clonus ; plantars flexor on both sides ; sphincters unaffected.

Since he has been under observation his headaches have been much less frequent and severe. He has not vomited since last November. The ptosis is much the same, but his mother reports she has noticed that he sometimes raises his lids quite well. There is definite, but limited improvement in the ocular muscles; he can now turn his eyes very slightly in nearly if not all directions. The proptosis is rather less marked, but he had an attack of conjunctivitis in March. The muscular atrophy in the shoulder-girdles has extended to the upper segments of the arms, and there is a suspicion of winging of the scapula. Bronzing of the skin, choreic twitchings, and enlargement of the isthmus of the thyroid were noticed on March 6. His pulse-rate was then 120. A strong faradic current applied to the deltoids produces a normal contraction and remains constant so long as the application is continued ; there is no altered mode of response to galvanism. An X-ray photograph of the head, taken by Dr. Findlay, will be produced. Dr. Harry Campbell has kindly seen the boy on two or three occasions, and can confirm the evolution of the symptoms during the last three months.

Dr. H. CAMPBELL : An interesting feature in this case (which Dr. Palmer has kindly afforded me an opportunity of seeing with him from time to time) is the history of migraine. It was shortly after an attack of migraine, accompanied by exceptionally severe vomiting—so severe, indeed, that the mother thought the boy would injure himself—that the paralysis set in. Ocular (and even facial) paralysis is, of course, known to occur in connexion with migraine, and I at first thought that this might be a case in point. There seems now, however, to be little doubt that the paralysis presents rather the features of myasthenia gravis. This affection is often found in association with Graves's disease, from which the boy is obviously suffering. Now Graves's disease is known to involve abnormality as regards the thyroid secretion, and it is significant that one of the internal secretions—i.e., adrenalin —has a paralysing action on certain involuntary muscles (i.e., those which are inhibited by the sympathetic). This raises the question whether, as the result of morbid activity in the internal secretory glands, substances may not sometimes be produced capable of paralysing skeletal muscles. The case emphasizes the important part which the blood takes in the causation of nervous disease. The migraine and the Graves's disease are certainly due to perverted blood plasma, and it is practically certain that the paralysis is also.

(*May* 25, 1916.)

Case of Gummatous Meningitis.

By P. HAMILL, M.D.

N. T., AGED 26, needle-woman, unmarried, first complained of cramps in the left hand two and half years ago. A few months later she complained of wasting of the muscles of the same hand, and improved somewhat under a four months' course of electric baths. Afterwards she gradually got worse. Since January, 1916, she noticed wasting of the right hand, which got rapidly worse during March. There were no cramps. Since the autumn of 1915, she has suffered from trophic ulcers of the right thumb, which have healed during the last three weeks. Her general condition is good and there has been no difficulty in walking. No sphincter trouble has been present except some urgency of micturition. There is some wasting of the right pectoralis major, trapezius and rhomboids, and marked wasting of the forearm muscles and intrinsics of the hands on both sides. Fibrillary tremors are present in the wasted muscles. Electrical reactions (May 5) show complete reaction of degeneration of all left intrinsics, and the rest of the limb muscles are normal. On the right the reactions of the hand muscles are weak but normal in type. The rest of the upper limb muscles are normal. There is considerable sensory impairment to touch, pin-prick, heat and cold in the arms and over the chest. There is a band of anæsthesia corresponding to the right fourth thoracic segment. Localization is good where the stimulus is perceived; stereognosis is normal. There is inequality of the pupils, but no other eye signs were found. The tongue is wasted on the right side more than the left, and tremors are present. The other cranial nerves appear normal. The lower limbs are normal, sensation is not impaired, and the reflexes are normal.

Skiagrams of the spine show no evidence of gross disease.

Wassermann's reaction in the blood is strongly positive.

(*May* 25, 1916.)

Case of Muscular Dystrophy.

By P. HAMILL, M.D.

F. C., FEMALE, aged 16, complains of weakness of arms, and difficulty in walking upstairs. At the age of 13 it was first noticed that she had a peculiar gait, leaned to one side as she walked, and frequently fell. Soon afterwards it was noticed that she had to rest her elbows on a support when brushing her hair. She also began to have difficulty in walking upstairs. Last year she had difficulty in holding up her head. No sphincter trouble.

Previous history: Nephritis, for which she was treated in hospital.

Family history: Five brothers and five sisters, all well. No family history of any similar affection.

Present condition: Ptosis of left eye, said to have been present from an early age. There is weakness of the muscles concerned in the maintenance of the erect posture. The shoulder-girdle muscles are weak, and the deltoids, triceps, and biceps much wasted. The intrinsic muscles of the hand are apparently unaffected. The lower limb muscles are less affected. The electrical reactions of the affected muscles are of normal type. Sensation and reflexes are normal in type.

Under treatment there has been great general improvement, the shoulder-girdle muscles are much stronger, but the biceps are still weak.

(*May* 25, 1916.)

Case of (?) Syringomyelia.

By JAMES TAYLOR, M.D.

B. C., FEMALE, aged 22. March, 1914: Numbness began in the fingers of left hand; this was not continuous but would come on and go off during the day, and was worse in winter than in summer. July, 1915: Pain began just above wrist of left hand; this symptom has continued and is becoming worse. A month later pain was felt on the dorsal and palmar surfaces of the same hand, and would run up from the finger-tips to the shoulder.

Present condition shows marked prominence of the eyeballs; the disks are healthy, and there are no cranial nerve defects. Motor system: Muscular power appears good (right 70, left 60—hand). On the left side there is wasting of the small muscles of the hand, more particularly of the hypothenar eminence and first dorsal interosseous; muscles of thenar eminence and second, third, and fourth dorsal interossei are also wasted, but not to such a marked extent. There is slight, if any, wasting of the corresponding muscles of the opposite side. All muscles react to faradism. Sensory system: There is sensory loss to medium degrees of heat extending over cutaneous areas of the posterior roots from the fourth cervical to fourth dorsal (arms and upper half of chest) on both sides; higher degrees of heat are well recognized. Sensation to cold is not recognized. No disturbance of other sensations, and there is no astereognosis. Reflexes of lower limbs are increased, plantar reflexes give double extensor responses. Reflexes in the upper limbs are diminished.

(*May* 25, 1916.)

Case shown for Diagnosis at a previous Meeting.

By Hugh Thursfield, M.D.

H. W., MALE, aged 49, was shown at the Neurological Section on February 24, 1916, for opinions as to diagnosis. His symptoms were giddiness, persistent vomiting, and a tendency to fall backwards, which began five years previously and had gradually increased in severity. He had no paralysis, and no retinal lesion. At the meeting various opinions were expressed, but it was agreed that before any further step was taken the left ear, which was the seat of a labyrinthine deafness, ought to be explored. On March 8, Mr. C. E. West completely removed the labyrinth. The patient made an uninterrupted recovery, and the vomiting was entirely relieved. A left facial palsy followed, which still persists. The giddiness, though improved, is still present, and occasionally he suffers from vomiting. The tendency to fall backwards is also frequently marked. Though on the whole there is considerable improvement, it cannot be said that the operation has abolished his symptoms. There is no further development which would point to intracranial disease.

Dr. CAMPBELL: Is facial paralysis common after the operation for removal of the labyrinth?

(*May* 25, 1916.)

Neoplasm of the Lumbar Region of the Spinal Cord.

By H. CAMPBELL THOMSON, M.D.

W. J. B., BORN 1878, a fitter's mate, married. In February, 1913, this patient suffered from a febrile illness called "influenza" in which the right ankle was affected; he was laid up for a few days only, but for some considerable time afterwards he could not use his right foot properly. During the summers of 1913 and 1914 he played cricket and acted as wicket-keeper, but one Sunday in August, 1914, after rather a long walk he noticed that he was dragging the toes of the right foot when walking on the level. Some weeks later his right knee went wrong so that he could not bend it properly. At this time he did not complain of any alterations in sensibility, but about November, 1914, he began to complain of "pins and needles," "tingling," and "a feeling at times as if blood were being forced" into the right foot, coming on in attacks lasting for variable periods. The weakness and paræsthesia of the right lower extremity gradually increased in severity, but he continued at work until July, 1915. He ceased work as soon as he found that he could not walk without a stick. On September 9, 1915, he first came under observation complaining of a "burning pain below the right knee and weakness of the right foot and ankle." At that time he gave evidence of a local lesion affecting the fifth lumbar root on the right side. X-ray examination of the spine showed no changes in the vertebræ. The cerebrospinal fluid reacted negatively to the Wassermann test, showed no pleocytosis, and contained no excess of proteid. The Wassermann reaction in the blood was also negative. He was admitted in-patient at the Middlesex Hospital under the care of Dr. Pasteur for six weeks, but he did not improve under treatment.

About November, 1915, he began to suffer from "shooting pains in both legs below the knees" and to complain of "contraction of the lower extremities with drawing up of the ankles and toes, more especially of the halluces." He was given a surgical boot for the right foot with uplifting toe-spring.

In January, 1916, he first noticed trouble in holding and in passing water; at first this would only prove troublesome on some occasions, later it became much more noticeable.

Since January, 1916, the weakness of the right ankle and foot has increased, the drawing up of the legs has become more frequent and the pains in the two lower extremities have become more severe.

At the present time no abnormal signs are forthcoming in the heart, lungs, vessels, abdomen, and urine. He is well covered, well developed, and not anæmic. The special senses, cranial nerves and mental state are unaffected and he states that above the level of the umbilicus he feels a normal man. The knee-jerks on both sides are grossly exaggerated and on each side ankle clonus is easily elicited. Both plantar responses are extensor. The abdominal reflexes are readily obtained. The wrist- and elbow-jerks are normal. The right lower extremity generally is smaller than the left, and in the middle of the thigh measures 2 cm. less in circumference. The anterior tibial and calf muscles are poorly developed and flabby. The right ankle is dropped and the only movement possible at the right toes is some slight amount of dorsiflexion; neither eversion nor inversion of the ankle is possible. All movements of the left ankle and toes can be performed weakly through a full normal range. Rombergism is not present. The upper extremities are unaffected. The skin of the right ankle and foot is devoid of hair, is blue and appears glazed and sodden, whilst that of the left foot appears somewhat affected, but to a much less extent. After a period of rest in bed there is no œdema, but on standing the right foot and ankle swell and pit upon pressure. After a hot bath both legs below the middle of the shin become red and erythematous.

The patient complains of contractions of the legs with drawing up of the knees and hips, "shooting pains, tingling, and forcing sensations, as if the foot were going to burst," in both lower extremities below the level of the middle of the shins. On examination with the dragged point of a pin or with the painful current he complains that he is "tender" over an area corresponding to the distribution of the fifth lumbar and first sacral roots on both sides, and shows some slighter over-reaction over the front and back of the lower abdomen corresponding to the right and left eleventh thoracic roots. Over the hyperalgesic areas he says a prick "hurts more," "makes me jump," is "bigger," and "I can't say where it is so well." On neither lower extremity can any area showing complete loss of the power of appreciating the pain of a pin-prick, heat or cold be determined, and nowhere is there any demonstrable loss to cotton-wool. On both soles the threshold to the compasses is increased above average limits. He recognizes with difficulty passive moments and postures of the toes, and says that it is easier to answer from the left foot than from the right. To the tuning-fork test on the upper extremities and bony thorax he responds readily; below this level the duration of appreciation is lessened, and on both feet only the most violent vibrations are appreciated. On the front of the thighs and over the saddle-shaped area of the cauda equina sensation is completely normal to all modes of testing.

He complains of difficulty in holding his water, exhibits frequency of micturition, but has never been troubled with retention of urine.

Dr. E. G. FEARNSIDES: The most striking aspect of the manifestations exhibited by this patient is the great amount of motor weakness associated with spasticity, and the small amount of sensory interference. When I examined the patient a few days ago the abdominal reflexes were readily obtained, but to-night I was unable to elicit any. In a series of cases of extramedullary neoplasm of the spinal cord which I have recently worked through, I was struck by the fact that on the sensory side the signs of interference with sensibility are usually strictly localized, and thus differ from the signs associated with that more diffused diseased state, recognized at operation or autopsy by the enormous effusion into the meninges, usually described as meningitis serosa circumscripta. In cases of localized neoplasmata until quite a late stage of the disease, between the skin supplied by the nerves given off at the level of local interference and that supplied by nerves which are affected remotely, an area of relatively normal sensibility is the rule, but in the more diffuse meningitis serosa circumscripta the finding of this gap is rare. In Dr. Campbell Thomson's case, when I examined the patient some days ago, this gap was well shown; hyperalgesia was present over the eleventh thoracic segments on both halves of the trunk, and also over the areas supplied by the fifth lumbar and first sacral roots on both lower extremities, whilst no sensory interferences could be made out on the areas supplied by the twelfth thoracic and first, second, third and fourth lumbar segments. On these findings a small local lesion at the level of origin of the eleventh thoracic nerve from the spinal cord would have explained the patient's condition and would have led to a diagnosis of an extramedullary neoplasm. On the other hand, the recent loss of the abdominal reflexes would now point to a more diffuse lesion, probably of the nature of meningitis serosa circumscripta.

(*May* 25, 1916.)

Case for Diagnosis.

By J. S. RISIEN RUSSELL, M.D..

A. H., MALE, aged 20. Acute illness with sudden onset early in March, 1916; headache, vomiting, and cervical rigidity were present. Cerebrospinal fluid was clear, no meningococci. Acute symptoms passed off, leaving left facial paralysis. At the end of April he still complained of headache, and vomited several times. Double optic neuritis was marked. Right knee-jerk was very difficult to obtain; he complained of vertigo, and the gait was staggering.

On admission to the National Hospital on May 8, 1916, there was intense optic neuritis, + 8D. of swelling in both disks; no hæmorrhages; slight lateral nystagmus was present. There was well-marked right facial paralysis, with inability to close the eye completely; movements of right half of forehead very little impaired. Paralysed muscles show reaction of degeneration. The left hand was slightly weak, inco-ordination marked, no intention tremor but astereognosis present. Reflexes: Arm-jerks absent; right knee-jerk sluggish and could only be obtained on reinforcement; left knee-jerks normal; ankle-jerks present and equal; plantar responses flexor; abdominal reflexes brisk and equal; gait slightly ataxic.

Since admission there has been no headache nor vomiting. The optic neuritis remains the same. Wassermann reaction negative.

PROCEEDINGS
OF THE
ROYAL SOCIETY OF MEDICINE

EDITED BY
J. Y. W. MacALISTER

UNDER THE DIRECTION OF
THE EDITORIAL COMMITTEE

VOLUME THE NINTH
SESSION 1915-16

OBSTETRICAL AND GYNÆCOLOGICAL SECTION

LONDON
LONGMANS, GREEN & CO., PATERNOSTER ROW
1916

Obstetrical and Gynæcological Section.

OFFICERS FOR THE SESSION 1915-16.

President—

M. Handfield-Jones, M.D.

Past Presidents—

Sir Francis H. Champneys, Bt., M.D.
Sir J. Halliday Croom, M.D.
Alban Doran, F.R.C.S.
Herbert R. Spencer, M.D.
Sir William J. Smyly, M.D.
W. D. Spanton, F.R.C.S.
W. S. A. Griffith, M.D.

Vice-Presidents—

W. W. Chipman, M.D.
T. Watts Eden, M.D.
Archibald Donald, M.D.
H. Macnaughton-Jones, M.D.
C. Hubert Roberts, M.D.
G. Drummond Robinson, M.D.
Amand Routh, M.D.
Walter W. H. Tate, M.D.
Thomas Wilson, M.D.

Hon. Secretaries—

Cuthbert Lockyer, M.D.
H. Russell Andrews, M.D.

Other Members of Council—

J. D. Barris, F.R.C.S.
Comyns Berkeley, M.D.
G. F. Blacker, M.D.
Victor Bonney, M.D.
A. E. Giles, M.D.
William Gilliatt, M.S.
T. B. Grimsdale, M.B.
J. P. Hedley, M.C.
J. B. Hellier, M.D.
Eardley Holland, M.D.
J. M. Munro Kerr, M.D.
Gordon Ley, F.R.C.S.
R. G. McKerron, M.D.
J. D. Malcolm, F.R.C.S.Ed.
R. Drummond Maxwell, M.D.
H. Beckwith Whitehouse, M.S.
Florence E. Willey, M.D.

Representative on Library Committee—

T. G. Stevens, F.R.C.S.

Representative on Editorial Committee—

John Phillips, M.D.

OBSTETRICAL AND GYNÆCOLOGICAL SECTION.

CONTENTS.

May 7, 1914.

PAGE

Case of Glandular Carcinoma of Uterus in a Child, aged 2½ Years. By JOSEPH E. ADAMS, M.S., F.R.C.S. (Read by Dr. ATHOLE ROSS.) 45

July 1, 1915.

Adenomyoma of the Recto-vaginal Septum. By THOMAS G. STEVENS, F.R.C.S.... 1

February 3, 1916.

A Speculum-Camera. By HERBERT R. SPENCER, M.D., and E. A. BARTON, M.R.C.S. 17

Shown by HERBERT R. SPENCER, M.D.

(1) A Wire-fed Tubular Needle for use in Closing Vesico-vaginal Fistulæ 20

(2) A Needle-holder for Vaginal Hysterectomy and Deep Pelvic Work ... 20

Three Cases of Labour obstructed by Ovarian Cyst. By WALTER SALISBURY, B.S. 21

Fatal Rupture of the Bladder during the Puerperium. By FRANCES M. HUXLEY, M.D. 24

Chorionepithelioma following Vesicular Mole. By M. HANDFIELD-JONES, M.D.... 27

Presidential Address. By M. HANDFIELD-JONES, M.D. 31

May 4, 1916.

PAGE

A Fourth Case of Primary Carcinoma of the Fallopian Tube. By HERBERT R. SPENCER, M.D. 49

Bilateral Papillary Growths of the Fallopian Tubes. By H. RUSSELL ANDREWS, M.D. 61

Primary Epithelioma in Tuberculous Tubes. By Lady BARRETT, M.D. ... 63

Pre-cancerous Changes seen in the Displaced Epithelium of Nodular Salpingitis. By CUTHBERT LOCKYER, M.D. 68

Unilateral Solid Primary Adenoma of the Ovary. By HENRY BRIGGS, F.R.C.S. 73

A Second Case of Pneumo-peritoneum, probably induced by the *Bacillus aerogenes capsulatus*; Release of the Gas; Recovery. By JOHN D. MALCOLM, F.R.C.S.Ed. 85

June 8, 1916.

Strangulation of a Myomatous Uterus by Torsion of the Body on the Cervix; Supra-cervical Hysterectomy; Recovery. By JOHN D. MALCOLM, F.R.C.S.Ed. 89

Specimens shown by FREDERICK J. McCANN, F.R.C.S.

(1) Fibromyoma undergoing Cystic Degeneration growing from a Myomatous Pregnant Uterus 91

(2) Paravaginal Soft Fibroma 94

Three Cases of Hæmatoma of the Abdominal Wall. By H. RUSSELL ANDREWS, M.D. 98

Ectopic Pregnancy (probably Primary Abdominal). By FREDERICK J. McCANN, F.R.C.S. 103

Acute Hepatic Toxæmias complicating Pregnancy and Labour. By JOHN PHILLIPS, M.D. 115

The Society does not hold itself in any way responsible for the statements made or the views put forward in the various papers.

JOHN BALE, SONS & DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

Obstetrical and Gynaecological Section.

President—Dr. M. HANDFIELD-JONES.

(*July* 1, 1915.)

Adenomyoma of the Recto-vaginal Septum.

By THOMAS G. STEVENS, F.R.C.S.

CONSIDERABLE attention has been directed recently to adenomyomatous growths arising in the uterus and invading the rectum, sigmoid, and other parts. In this country cases have been described by Cuthbert Lockyer, Herbert Spencer, Archibald Leitch, Gough and Stewart, and Sir John Bland-Sutton. In some of these, notably those of Lockyer, Spencer, and Leitch, the growth was low down on the back of the cervix, whilst in others it was situated in the body of the uterus, and had involved the bowel by contact across the peritoneum. Some of these growths can be demonstrated as having an origin from the endometrium, a leash of tubules being traceable, by serial sections, from the uterine mucous membrane to the growth. A consideration, however, of other cases reveals no such connexion, and consequently their origin cannot be definitely ascertained.

In 1909 I demonstrated before this Section of the Royal Society of Medicine a specimen of adenomyoma of the recto-vaginal septum, and, as far as I can ascertain, this was the first case of the kind described in this country. The patient was single and complained of menorrhagia and dysmenorrhœa. On examination, two small nodules were found beneath the vaginal mucosa behind the cervix, and one was also found in front, in addition to a somewhat enlarged uterus. The posterior nodules were free and movable, neither being larger than a Barcelona nut. The anterior one was more fixed, being attached to the vaginal mucosa. The posterior nodules were removed with difficulty owing to their mobility, but were found to have no attachment to the uterus, peritoneum, or rectum, and had around them a complete layer of connective tissue. Both nodules were typically adenomyomatous. The anterior nodule turned out to be a cyst lined by columnar epithelium and apparently had no relationship to an adenomyomatous growth. I ventured to suggest at the time that these growths were derived from Wolffian remnants, and pointed out the similarity of their structure to these remnants as seen in the hilum of the ovary and in the mesovarium (figs. 1 and 1A). [Referred to as Case I, &c.]

During the last eighteen months five more cases of this kind have come under my care, and the following is a brief description of them:—

Case II.—E. W., aged 25, was admitted to the Memorial Hospital, Mildmay Park, in October, 1914, on account of sterility. The patient had been married six years and had had no sign of pregnancy. The menstrual periods had been excessive since marriage, lasting six or eight days with a four-weekly periodicity. The periods were accompanied by abdominal pain at the onset. On examination the uterus was found to be vertical in position, not obviously enlarged, and no lesion of the tubes or ovaries could be detected. In the posterior fornix a hard, rather nodular mass was felt about the size of half a walnut, fixed to the posterior aspect of cervix, and closely adherent to the vaginal mucous membrane. This mass was only movable with the cervix. Seen through a speculum the surface of the vagina was somewhat puckered over the surface of the growth. The growth was dissected out with some difficulty along with the vaginal mucous membrane attached to it. The rectal muscle was seen very closely attached to the growth but was apparently not actually involved. Troublesome bleeding from a large artery occurred, necessitating leaving a Spencer Wells's forceps in the wound, as the vessel could not be securely tied. The wound healed without giving any trouble. Sections made through the whole of the tissue removed showed that the growth is an adenomyoma. Some of the tubules are dilated and some approach very close to the vaginal surface. The cut edge on the deep surface goes through the growth, so that it is highly probable that a portion has been left behind in the cervix. No rectal muscle is seen in the section. Fig. 2A is a drawing of the whole section of the growth magnified eight times. Fig. 2 shows the relative position of the growth.

Case III.—E. J., aged 42, married, complained of sterility, and excessive losses at the menstrual periods. The periods were regular, with a four-weekly periodicity, lasting only two to three days, but during this short time the loss was profuse. On examination the uterus was normal in size and position, but in the posterior fornix there was a small hard growth, over which the vaginal mucous membrane was movable. The growth was attached to the back of the cervix and could only be moved with it. The cervical tissues felt unusually hard and rigid. The growth was so like that found in Case II, that the diagnosis of adenomyoma was made and its removal advised, the uterus to be dilated and curetted at the same time. This was done in November, 1914. Nothing of interest was found in the curetted uterine material. The

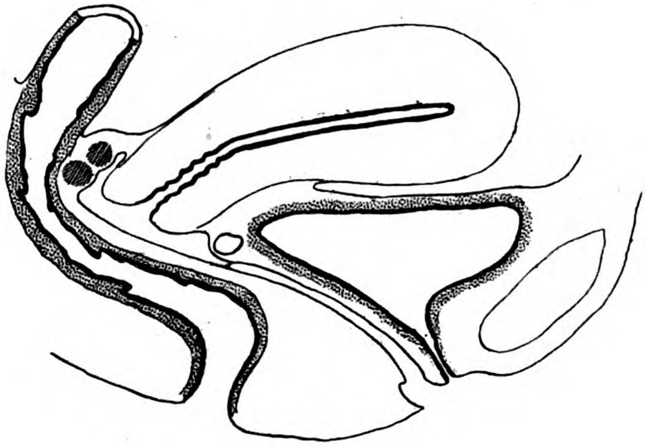


FIG. 1.

Shaded lines represent two small growths in the posterior fornix. Small cyst in anterior fornix. (Case I.)

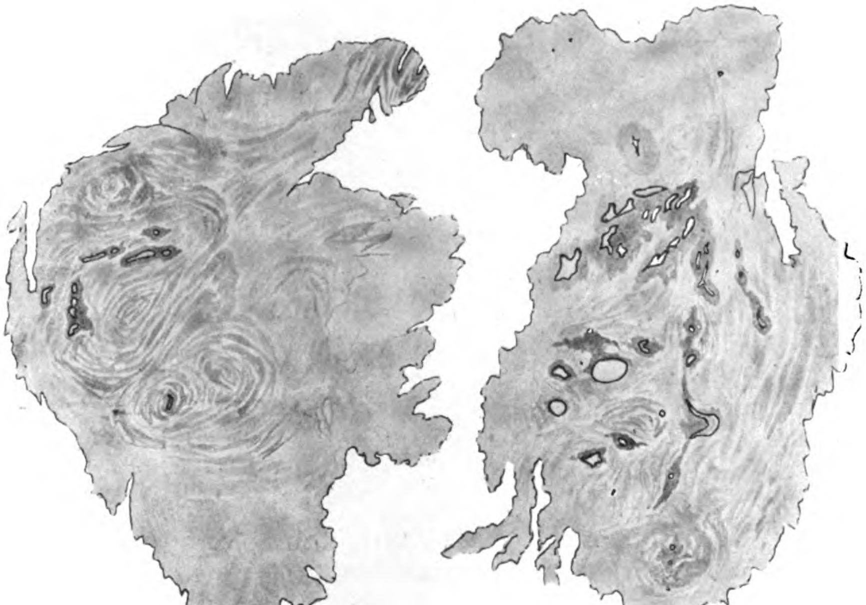


FIG. 1A

The deeply shaded parts are the tubules of the growth surrounded by smooth muscle (× 8.)

small growth had involved the muscular coat of the rectum, and a small piece of it was removed with the growth. The peritoneum of Douglas's pouch was also adherent to the growth and was opened during the operation. A small gauze drain was inserted through the peritoneal opening and the incision in the vagina was sutured around it. There were no disturbances during the convalescence, the small wound being quite healed in ten days. A section of the whole growth, seen in fig. 3A, shows it to be an adenomyoma.

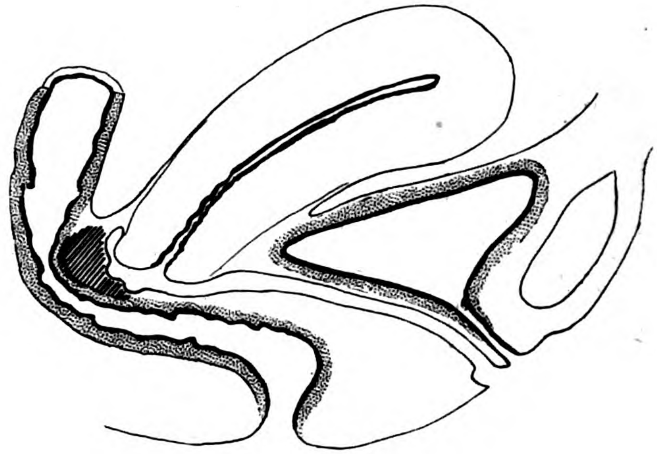


FIG. 2.

Shaded lines represent the growth in the posterior fornix. (Case II.)

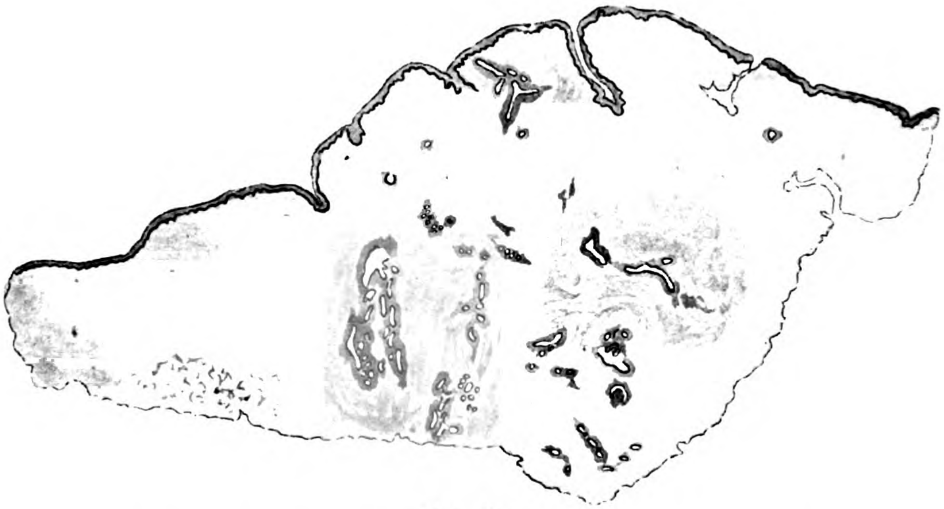


FIG. 2A.

Darkly shaded tubules of the growth ; vaginal mucous membrane above. (× 8.)

Case IV.—E. S., aged 43, married, three children, was admitted to St. Mary's Hospital in November, 1914, complaining of irregular bleeding—almost continuous loss—for the last three years. In addition the patient complained of something protruding from the vulva which had been taken for a prolapse.

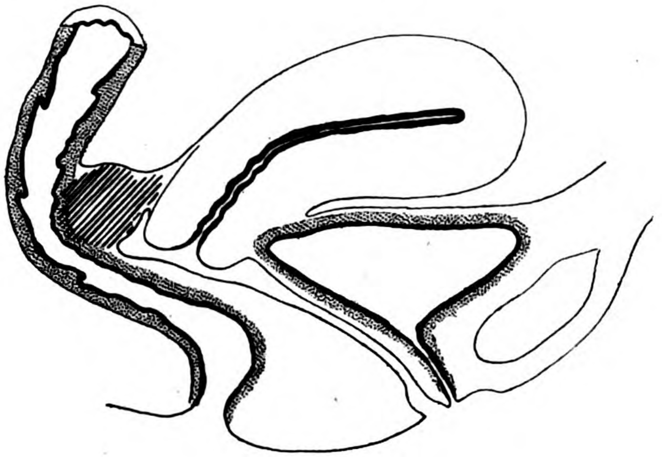


FIG. 3.

Shaded lines represent the growth in the posterior fornix. (Case III.)

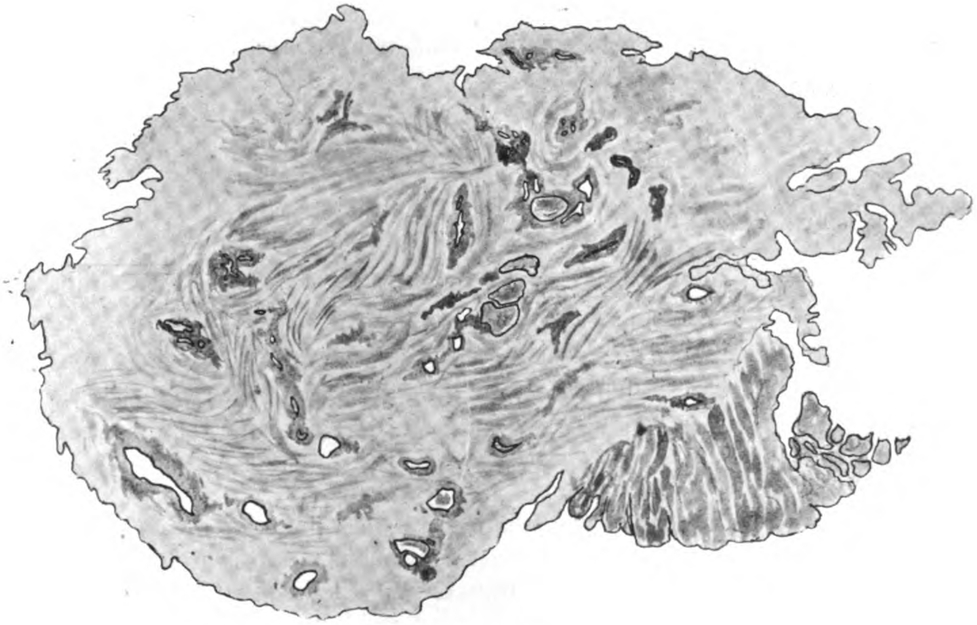


FIG. 3A.

The darkly shaded tubules of the growth. Fragment of rectal muscle coat in the right-hand lower corner. (× 8.)

On examination, the vulvar protrusion proved to be a cyst of the posterolateral part of the vaginal wall, rather bigger than a hen's egg. Its protruding surface was covered by dry skin, the rest by vaginal mucous membrane. It was arranged that the cyst should first be removed, and that the condition of the uterus should be investigated whilst under the anæsthetic. The cyst was easily dissected out entire, and its bed was closed by deep and superficial sutures. The uterus was found to be somewhat enlarged and irregularly nodular in shape. Although some dense induration was felt behind the cervix, this in conjunction with the nodular uterus was taken to be a cervical fibroid. Hysterectomy was performed a week after the removal of the cyst. In order to cut behind the indurated mass in the posterior fornix a panhysterectomy was performed. Whilst cutting into the vagina posteriorly below this mass it was found that the rectum had been widely opened. It turned out after examining the specimen that the indurated mass was really an adenomyoma of the recto-vaginal septum, which had involved the rectal wall and had drawn up a double fold of the rectum and fixed it closely to the cervix. The true pouch of Douglas was thus obliterated and what was taken for the pouch was really a fold of the rectal wall. In cutting into the vagina the top of this pouch was cut right off, and is seen in the section made from the specimen removed (fig. 4A). The hole thus made in the rectum was closed by a double row of sutures and gave no trouble during the convalesence. The adenomyomatous growth has the same structure as the other specimens, and its tubules can be seen penetrating right through the muscle coats of the rectum to the submucous tissue. Unfortunately the rest of the uterus was not kept, so that no attempt could be made to trace the origin of the growth.

It is very significant that in this case there was a large vaginal cyst as well as the adenomyoma. The vaginal cyst, there can be no doubt, is of Gartnerian origin, as it extended some distance up the lateral wall of the vagina. It seems possible that when one abnormality of the primitive sexual organs occurs, like this cyst, another abnormality like the adenomyoma may have arisen also from some remnant of the same apparatus, possibly a Müllerian duct abnormality. A somewhat similar coincidence, it may be remembered, occurred in Case I, where two small adenomyomata occurred in the posterior fornix, along with a cyst of probably Wolffian origin in the anterior fornix.[1]

Case V.—X. Y., aged 41; two children, the last one nine years previously. No miscarriages. Complained of almost continuous bleeding from June, 1914, until October, 1914, when she was first seen. Previous to June the periods had been excessive for several years, lasting eight days every seventeen days. Curettage had been performed by another surgeon two years previously. On examination, the uterus was found to be uniformly enlarged and was retroverted. It was a very heavy uterus, and in general suggested a condition of chronic metritis. Drug treatment had been tried by calcium lactate and other hæmostatics including ergot (which seemed to make the bleeding worse). As the patient was very anæmic, and curettage had been tried, hysterectomy was advised. In performing panhysterectomy, a mass was felt low down at the junction of the cervix and vagina, over which the peritoneum was puckered

---

[1] *Proceedings*, 1910, iii, p. 57.

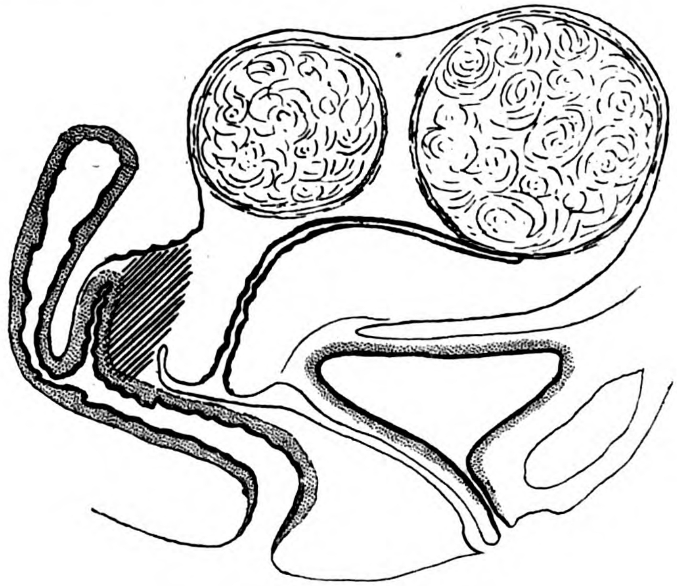


FIG. 4.

Growth in the posterior fornix and posterior wall of the cervix involving the rectum. (Case IV.)

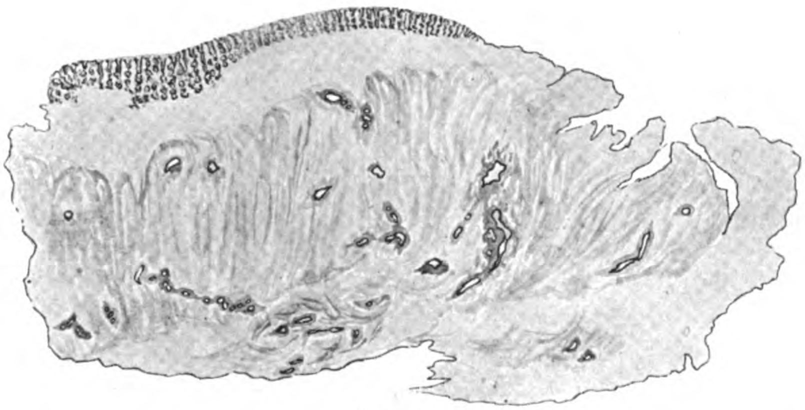


FIG. 4A.

Shaded tubules of the growth; rectal muscle and mucous membrane above. (× 8.

and cicatricial looking. The vagina was opened below this mass and the uterus was removed. The patient did well until the fourteenth day after the operation, when she died suddenly from pulmonary embolism. The mass in the

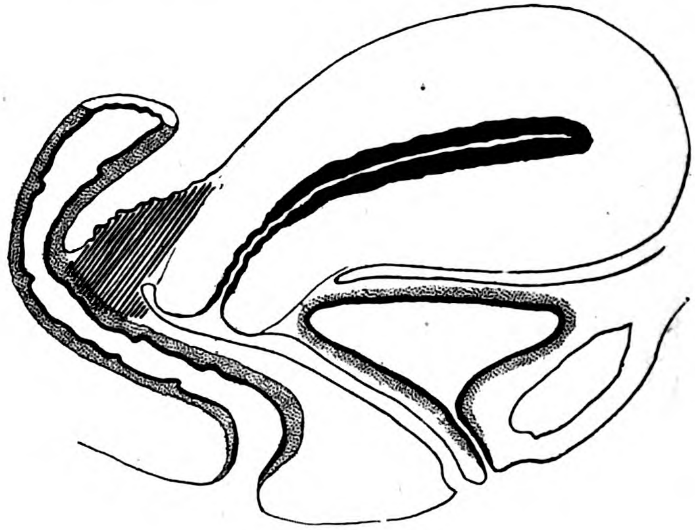


FIG. 5.

Growth in the posterior fornix and posterior wall of the cervix. (Case V.)

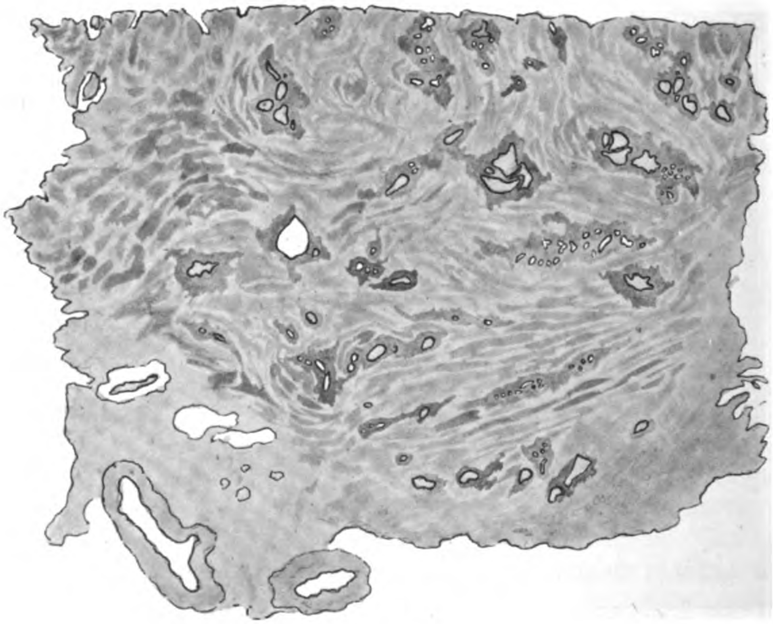


FIG. 5A.

Shaded tubules of the growth; rectal muscle above and to the left. (× 8.)

posterior vaginal fornix on section proved to be an adenomyoma, not involving the vaginal or rectal walls, but involving the peritoneum, as described above. The uterus proved to contain no growth, but had the usual features of chronic metritis with considerable thickening of the mucous membrane in addition. Unfortunately the uterus was not preserved, but as far as could be seen by the naked eye there was no connexion between the adenomyoma and the endometrium. A section of the adenomyoma is seen in fig. 5A.

Case VI.—S. B., aged 46, single, was admitted to St. Mary's Hospital on January 11, 1915. The last menstrual period had occurred in November, 1914; before then the periods had been regular and not excessive. At the end of the last period a sudden profuse hæmorrhage occurred, which continued for a month. This ceased three weeks before admission, and was followed by a yellow discharge which was offensive. On examination, the uterus was found to be retroverted, fixed, and very tender. There was a hard mass in the posterior fornix, involving the vaginal wall, and apparently continuous with the body of the uterus. There was no evidence of any malignant growth in the cervix, but considering the history, the pain, and the doubtful nature of the mass in the posterior fornix, it was decided to perform panhysterectomy. The operation was somewhat complicated owing to the dense infiltration of the posterior vaginal fornix, and the distortion of the relationship of Douglas's pouch which had occurred as a result. After dissecting the rectum off the posterior vaginal wall, it was possible to open the vagina below the infiltrating mass and so complete the hysterectomy. The patient made a good recovery.

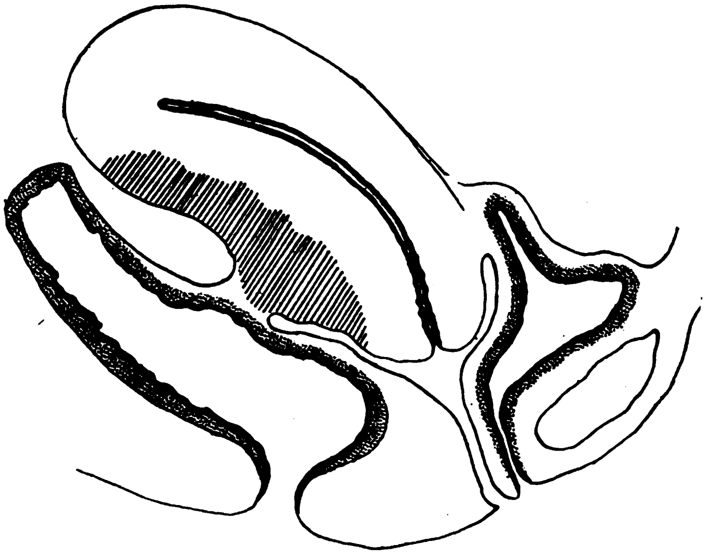


FIG. 6.

Growth in the posterior fornix and in the posterior uterine wall. (Case VI.)

The specimen, after removal, showed considerable distortion of the axis of the uterus owing to the cicatricial effect of the growth, which had drawn the vaginal wall up towards the posterior wall of the cervix and closely incorporated the two. A vertical median section of the uterus and vaginal wall showed a typical adenomyoma, involving about two-thirds of the length of the posterior wall of the uterus, but everywhere apparently separated from the endometrium by a thick layer of unaltered uterine muscle. Sections were made from the whole length of the posterior uterine wall, as shown in fig. 6A. All these sections, except that which includes the vaginal portion of the cervix, contain

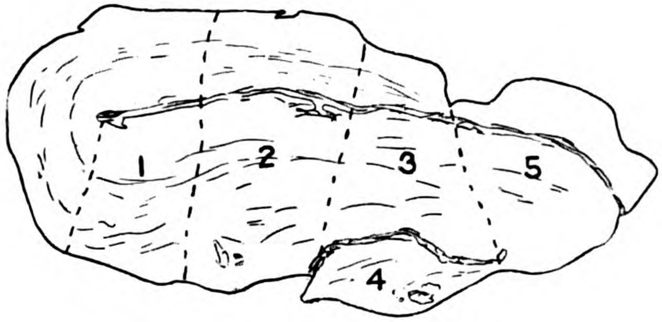


FIG. 6A.

The whole uterus, showing the places from which microscopic sections were made. (Case VI.)

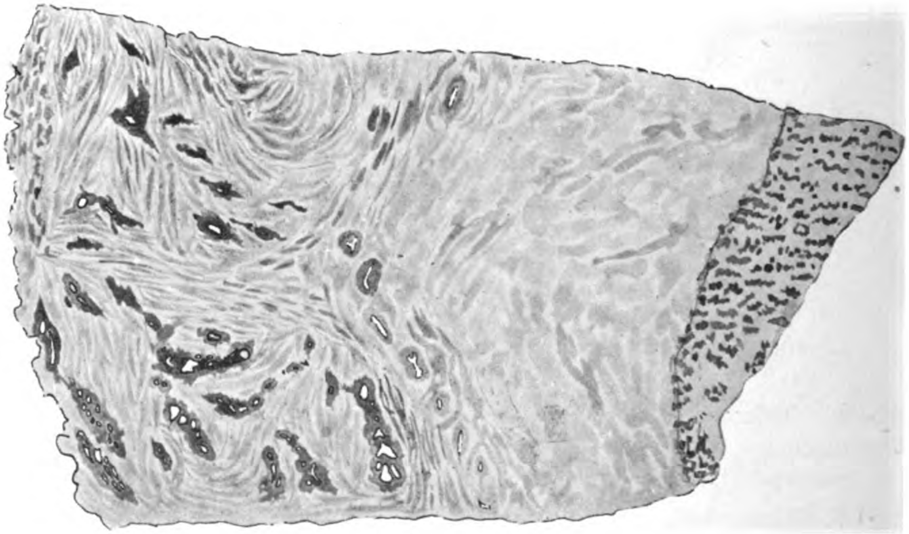


FIG. 6[1].

Shaded tubules of the growth ; uterine muscle and mucous membrane to the right. (× 8.)

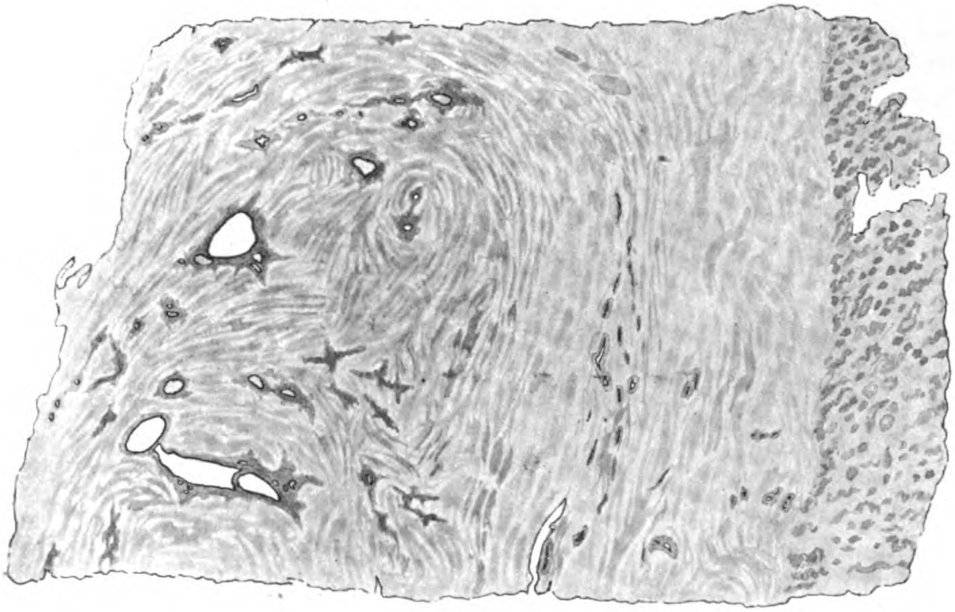


FIG. 6^2.

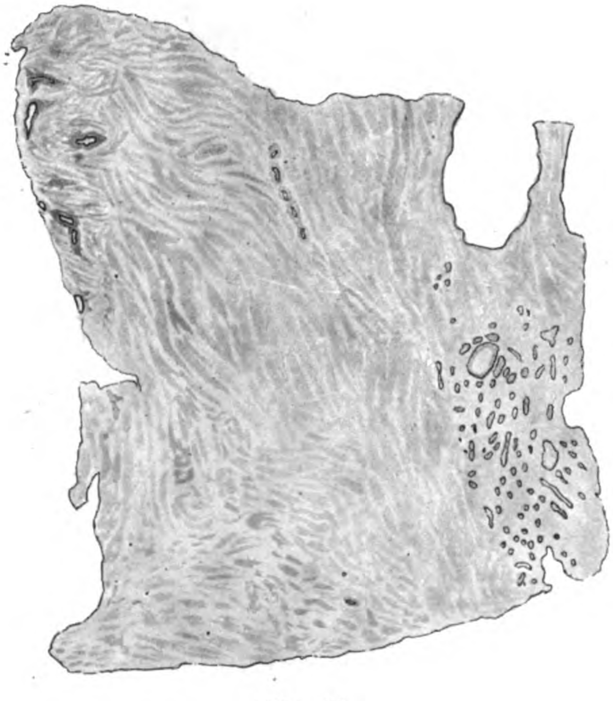


FIG. 6^3.

Very little growth to the left and above ; uterine mucosa to the right. (× 8.)

part of the adenomyomatous growth. The growth involves the peritoneum on the posterior uterine wall, but is everywhere separated from the endometrium by a layer of uterine muscle, about a centimetre or a little more thick. The line of junction of the growth and the uterine muscle in some sections, is at the plane where most of the big arterial branches are found. Microscopically the

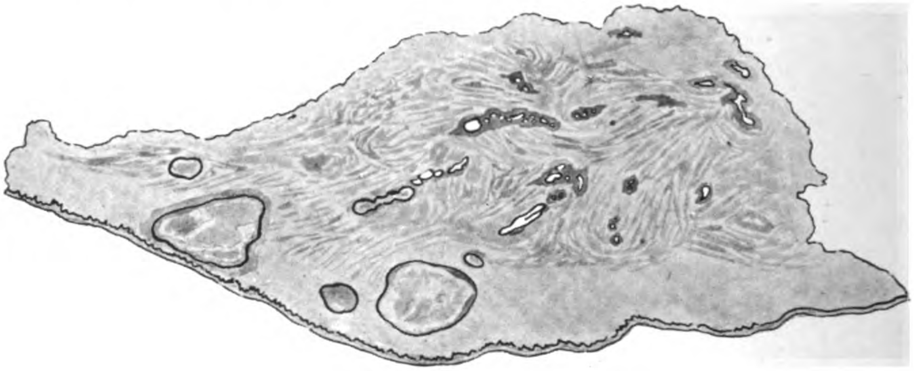


FIG. 6^4.

Vaginal mucous membrane below; growth tubules in upper part. (× 8.)

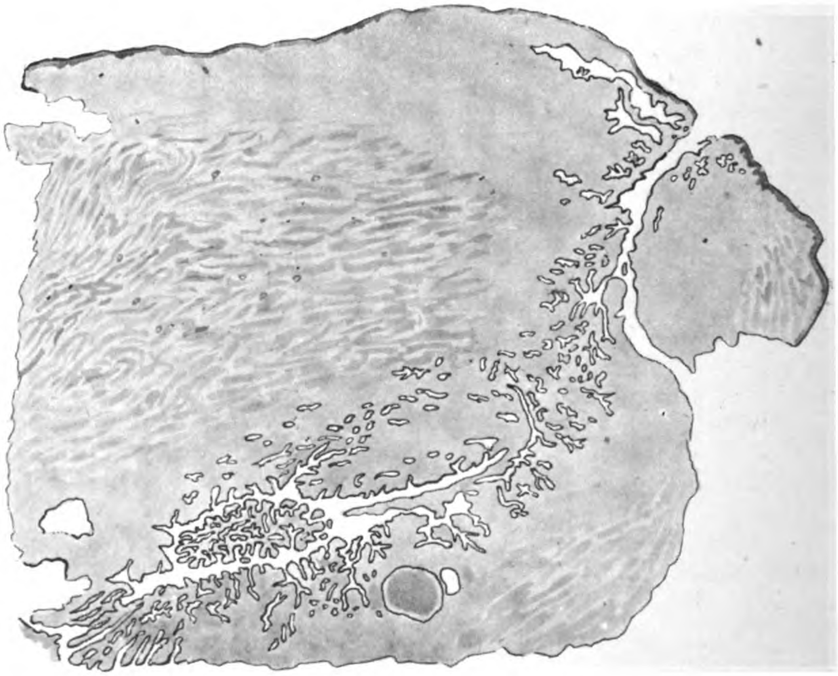


FIG. 6^5.

Cervical portion of the uterus; no growth. (× 8.)

growth has the same characters as that seen in all the other cases. No communication through the uterine muscle with the endometrium is found in any of the sections. Slices made through the uterus in other planes also fail to show any communication when examined with a hand lens. The large extent of the growth in this case would have made an endometrial origin most probable, but this cannot be substantiated by any of the sections. Figs. 6^1, 6^2, &c., are the drawings of the sections.

REMARKS.

First, it must be noted that in all these cases except, perhaps, the last the growths must be regarded as accidental discoveries, and apparently have no direct relationship to the symptoms complained of. In one case (I) the symptoms were menorrhagia and dysmenorrhœa, in two (II and III) the only important complaint was sterility, whilst in the other three bleeding was the chief symptom, due in one case to fibroids of the body of the uterus, in another to chronic metritis, and in the last to some unexplained general condition associated with the menopause. It can hardly be expected that menorrhagia could be caused by these growths in Case I, as they were quite isolated nodules in the recto-vaginal septum, moreover, the excessive loss was cured by curettage, so that diffuse adenomyoma of the endometrium can be excluded.

Sterility is often difficult to explain, and yet it can hardly be alleged that these growths were the cause of it in Cases II and III. The growths were limited to the posterior fornix, but at the same time were closely adherent to the back of the cervix, and by their dense character must have fixed the cervical tissues and impaired their pliability. Is it possible that this fixation might interfere with the entrance of spermatozoa into the cervical canal? Neither patient has yet become pregnant, and even if they had become so it could not be accepted that the removal of the growth had favoured conception. In Cases IV and V there was so marked a lesion in the body of the uterus (fibroids in one and chronic metritis in the other) that it was unnecessary to look any further for the cause of the bleeding. Even in the last case, where there was no demonstrable cause for the single copious hæmorrhage, the growth can hardly be blamed, as it cannot be shown to affect any portion of the endometrium.

The *site* in which these growths are found in all my cases was the recto-vaginal septum. Perhaps it is not quite correct to say the septum, because it was really in the loose connective tissue above the posterior fornix, which is bounded by the back of the cervix in front, the rectum behind, and the peritoneum above. Other sites have, however, been described. I have a specimen of one of these growths in the round ligament, another in this situation was described by Lecène, and Klager has described one in relation to a ventrofixation cicatrix, but that one was really attached to the anterior wall of the uterus.

The *diagnosis* of these growths is usually easy. To the finger they present hard, nodular masses, usually in the posterior fornix, although there seems to be no reason why they should not occur in front or at the side of the uterus. Usually they are fixed to the back of the cervix and only movable with it. They are not tender to the touch, and they do not necessarily cause any pain. When they involve the rectal wall they can be felt *per rectum* fixing its wall to the vaginal wall more firmly than usual.

Prognosis. — It is difficult to appraise the importance of these growths, as regards symptoms and as regards danger to life. From the cases cited it certainly appears as if symptoms are only likely to be caused when the growths are of long standing, and have involved the rectum to a considerable degree. Nothing is known as to their rate of growth or the age at which they commence, and consequently, their life-history can only be worked out by keeping cases under observation, if necessary for years, without operative interference. It may be asked, is it necessary to remove these growths at all? In my first three cases the removal of the growths was deliberately undertaken, because their nature was obscure, and the possibility of malignancy could not be excluded. Also in Cases I, II and III other operations were indicated (dilatation and curettage), so that it was thought that the patient would not be exposed to any undue risk if the growths were removed as well. In the last three cases the growths had to be removed in order to complete the operation of hysterectomy on other grounds. If the growths can be diagnosed with certainty, and it certainly seems as if they can, there is no urgent necessity to remove them unless some radical operation is indicated on other grounds. On the other hand, it seems inevitable that these growths must sooner or later involve the rectum, and bearing in mind Lockyer's case in which the rectum was so narrowed that a colostomy must have become necessary, it seems that for this reason their early removal is indicated.

Operative Technique.—The removal of these small growths *per vaginam* is by no means a simple matter. Their adhesion to the back of the cervix, and the manner in which they involve the rectum and the peritoneum of Douglas's pouch constitute technical difficulties. In Cases II and III the growth had to be dissected out from the rectal muscle, leaving practically only mucous membrane over a small area, and in Case III the peritoneum was opened during the dissection. It is as well, where possible, to pucker the rectal muscular coat with a buried catgut suture, so as to support the denuded mucous membrane, before closing the vaginal incision. In the second case, a large vessel was opened at the bottom of a rather deep hole behind the cervix and a Spencer Wells's forceps had to be left upon it, as it was impossible to tie the vessel securely. Thus it is seen, that unless great care is exercised, the rectum might easily be opened during the operation and its closure would be extremely difficult. Similar difficulties arise when the growths are being removed by the abdominal route during hysterectomy. In Case IV the rectum was widely opened before it was recognized that the bowel was even involved. In Cases V and VI most careful dissection was necessary in order to avoid opening the bowel, and sutures had to be placed in the rectal wall to pull the muscle together. In none of the cases were there any symptoms referable to the rectum during convalescence, and no fistulæ resulted.

Now that further knowledge of the nature of these growths has accumulated, it seems highly probable that in Cases II and III the growths must have been incompletely removed, part having been left behind in the wall of the cervix. These cases will be kept under observation to see whether the tumours continue to grow.

Histology.—The microscopic appearance of these growths has already been well described, both in my original communication in 1909 and also by later writers on the subject. They have precisely the same structure as a diffuse adenomyoma of the endometrium, but as a rule the gland tubules surrounded by endometrial stroma are few in number, whilst the smooth muscle and fibrous tissue surrounding them are relatively abundant. The tubules are thus often widely separated from one another. The tubules are often dilated and cystic, showing that they must have secretory powers to some extent. They not infrequently contain blood, or old blood pigment, suggesting that sometimes they share in the menstrual function. It must be admitted, however, that the number of tubules containing blood is comparatively small. The tubules are lined by moderately long columnar epithelium like that of the body of the uterus, but not showing any evidence of cilia. The stroma immediately outside the tubules is composed of cell elements exactly like the stroma of the endometrium. The amount of it varies considerably, but no tubules are found entirely without it. The fibromuscular part of the tumour is clearly a definite new growth, composed of bundles of smooth muscle cells in a fibrous stroma, like a fibromyoma. Although there is no capsule around these tumours, the arrangement of the fibromuscular tissue is such that the growth is quite sharply marked off from the uterine muscle coats. This line of demarcation can be seen both with the naked eye and microscopically in the specimen Case VI, in which the whole uterus and growth has been preserved. The appearance of sections stained by Van Gieson's method gives the impression that there is more fibrous tissue and less muscle tissue in the growth than there is in the uterine wall. This accounts, perhaps, for the somewhat greater hardness of the growth than that of the uterine wall, and also for the line of demarcation between the two. In none of the specimens was anything found suggestive of an inflammatory lesion: thus there seems to be no warrant for the name "adenomyositis," which some writers have given to the condition.

Causation.—The origin of these tumours is still far from settled. The possible sources which have been suggested are: (1) The endometrium; (2) Müllerian remnants in the recto-vaginal septum; (3) Wolffian remnants in this situation, and (4) the peritoneal endothelium. Recent writers, especially Leitch, have been inclined to favour the endometrium as the source of all adenomyomata, including those which, apparently, are isolated in the recto-vaginal septum. The suggestion is that endometrial tubules grow out through the muscular coats of the uterus, accompanied by their own stroma and by a new growth of fibro-muscular tissue. This is obviously the case in the more common instances of diffuse adenomyomata of the endometrium, and the continuity of the tubules with the endometrial glands is easily demonstrated. In the case of growths in the recto-vaginal septum, however, the distance from the endometrium is considerable, and although it has been done, it is difficult to trace the continuity of the growth tubules with the endometrial glands. It is quite possible, too, that the connexion between the two has been completely lost during the process of growth. Once started, however, the tumour continues to grow whether it preserves its connexion with the endometrium or not. Case VI was the only one of this series in which any attempt was made to trace the origin of the growth to the endometrium, and it must be said that no such connexion can be demonstrated, either by the aid of a hand lens or by means of microscopic sections. The two isolated tumours in Case I were so small, and so absolutely movable and unconnected with the uterus, that it seems highly improbable that they could have originated from the endometrium. In all the other cases the growth was closely connected with the back of the uterus, so that the endometrial origin was at least possible. My original view that these isolated growths were derived from Wolffian remnants is, I think, now untenable. The possibility, however, that they are derived from the Müllerian ducts, at the place where the fused ducts join the solid mass of cells from which the vagina is developed, cannot be disproved. The actual mode of formation of the vagina is not yet settled, and it is, at all events, possible that groups of cells might become detached from the hinder end of the Müllerian ducts, and by taking on separate growth and canalization, might form a new growth resembling the endometrium. The method of origin, that these growths are derived from the peritoneal endothelium, appears to me to be an unnecessary theory, when two, at least, of the other three theories seem to be so much more likely. Tubular structures certainly are sometimes seen in the broad ligaments which appear to be of peritoneal origin, but they are never associated with endometrial stroma or with a new growth of muscle and fibrous tissue. In none of the cases hitherto described has the possibility of an endometrial and Müllerian origin been absolutely negatived.

(*February* 3, 1916.)

A Speculum-Camera.

By HERBERT R. SPENCER, M.D., and E. A. BARTON, M.R.C.S.

FOR many years we have been impressed with the desirability of obtaining photographic records of tumours and other affections of the cervix and vagina, for which the ordinary methods of photography are not suitable. The "speculum-camera" fulfils this purpose. The instrument was put in hand by the maker (James Sinclair and Co.) in May, 1914. Various circumstances have delayed our bringing the instrument to the notice of the profession, and in the meantime (in July, 1914) Dr. Max Cheval[1] has published an account of an instrument for photographing the cervix uteri which differs from ours essentially in the fact that the camera and stand have to be brought up to the speculum in

---

[1] Max Cheval, "La photographie du col utérin," *Journ. belge de Gyn. et d'Obstét.*, July, 1914.

Dr. Cheval's instrument, while in ours the speculum and camera are combined and the focus is fixed. We have found in using our instrument several points in which improvements may be made; but we think the photographs exhibited (figs. 4, 5, and 6) show that sufficient success has been obtained to warrant our bringing the instrument to the notice of the profession.

The whole instrument measures 8¾ in. in length; the speculum (with the end cut at right angles) is 6⅛ in. long and has a diameter of 1⅜ in.; at the trumpet end of the speculum is a stud (fig. 2), which fits into a hole in the flange (figs. 2 and 3) attached to the camera, and by means of a hinged catch fixes the speculum and camera together immovably. The figures render any further description unnecessary. The camera is composed of an "Xpress" lens by Ross, of 2 in. focal length, working at f. 5·4, and has two stops, F 8 and F 11. The focus is fixed, and has a depth of $\frac{3}{16}$ in., so that for that distance all that falls in front of a plane ⅛ in. inside the speculum is in sharp focus. The plate is 4½ cm. by 6 cm. The tube of the camera fits into the speculum, but to avoid displacement of parts during its insertion by pushing a column of air down the speculum, some small studs project from the camera, preventing too close apposition of camera and speculum and yet maintaining rigidity between the two. The camera is entirely enclosed, and a disk of plane glass forms an air- and dust-tight window in front of the lens. During use it is necessary to warm this glass cap to prevent condensation of moisture, or the cap may be removed, with the advantage of a slight increase of illumination. The depth of sharp focus mentioned above could be increased by diminishing the size of the stop; but this would lengthen the exposure, which is now from twenty to thirty seconds. The illumination is obtained from a small accumulator by a circle of six lamps surrounding and just behind the lens (fig. 3). By lining the end of the speculum on one side with a piece of white paper better shading is obtained.

The speculum is passed while the patient lies on the left side and the projecting end is supported by sandbags. The cervix is dried and the speculum rotated so that the slide will not fall out, when the camera is inserted. After the camera is fixed in position a view of the cervix may be obtained on a ground glass screen if required, but this is found not to be necessary if the cervix does not project beyond the region of sharp focus as measured by a rod passed down the speculum. It would, however, be a simple improvement to insert a focusing arrangement in the camera, if it were required to emphasize by sharpness some special feature.

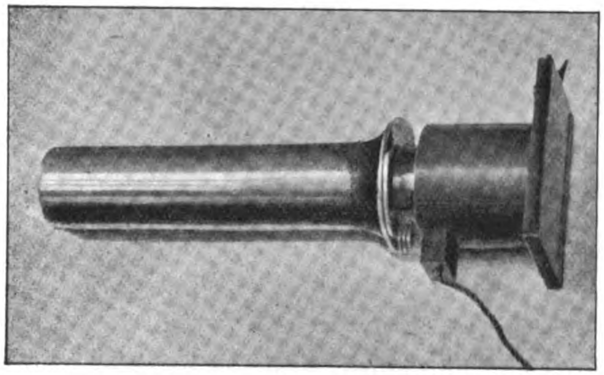


FIG. 1.

The camera-speculum complete; below, the flexible insulated wire passing to the accumulator.

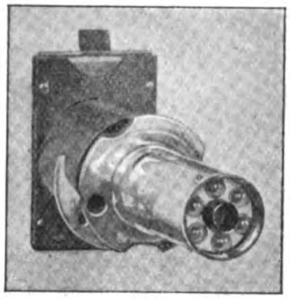


FIG. 3.

The camera, showing the lamps, lens, catch, and hole for stud.

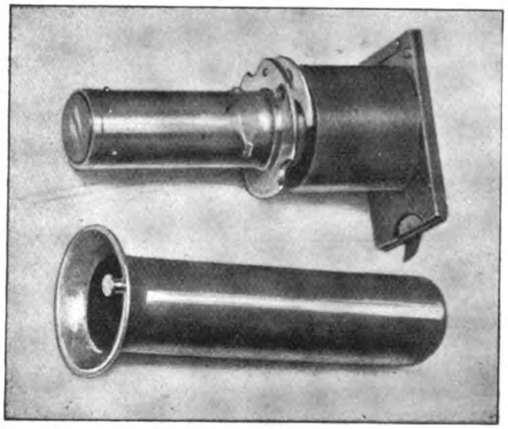


FIG. 2.

The camera and speculum separated, showing the stud and catch for fixing them together.

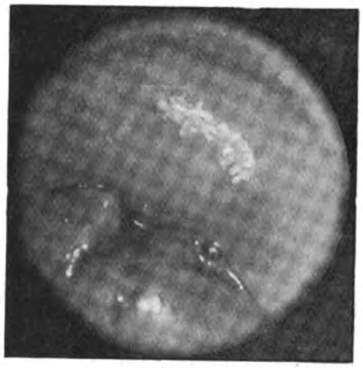


FIG. 4.

Photograph of lacerated cervix. ($\frac{3}{2}$ natural size.)

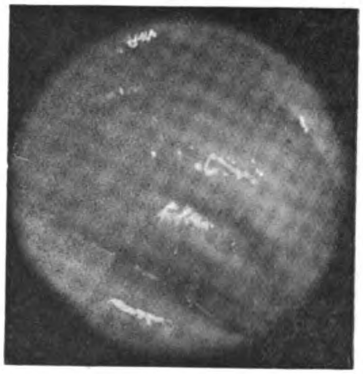


FIG. 5.

Photograph of cervix and fold of vagina. ($\frac{3}{2}$ natural size.)

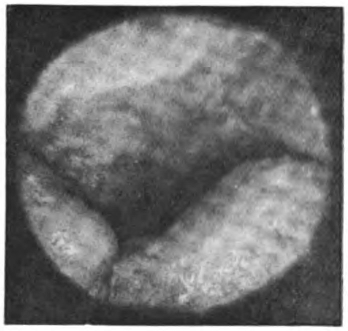


FIG. 6.

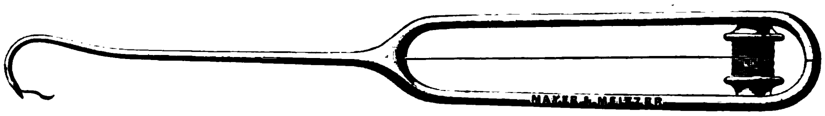
Photograph of cervix one week after reduction of inverted uterus, showing gaping cervix with laceration below. ($\frac{3}{2}$ natural size.)

(*February* 3, 1916.)

A Wire-fed Tubular Needle for use in Closing Vesico-vaginal Fistulæ.

Shown by HERBERT R. SPENCER, M.D.

THE needle is a modified and simplified form of the well-known Smith's cleft-palate needle, which the exhibitor has successfully used for more than twenty-five years for closing vesico-vaginal fistulæ. In Smith's needle the propulsion of the wire by pressure of the milled disk is not always satisfactory and the needle is not very rigid and is expensive. In the instrument shown the wire is propelled by grasping it with the finger and thumb, and rigidity is obtained by making the needle and handle in one piece. The end of the handle is split to enable the reel to be removed and replaced. Any curve could be given to the end of the needle, but the exhibitor finds by experience that the curve of the instrument shown is the best and is suitable for nearly every case. A thin rubber finger-stall can be slipped over the handle to protect the wire and reel, if thought advisable; the elastic cover permits the wire to be easily projected by the thumb and forefinger.



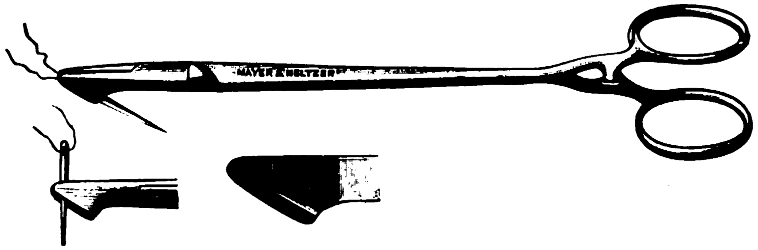
(*February* 3, 1916.)

A Needle-holder for Vaginal Hysterectomy and Deep Pelvic Work.

Shown by HERBERT R. SPENCER, M.D.

THE needle-holder was designed to hold a short thick pedicle needle made of "delta" metal (which does not rust) for carrying the ligatures for the broad ligament in vaginal hysterectomy and in ovariotomy.

With a finer slot it could be used to hold a fine ordinary sewing needle for suturing deep in the abdomen. Its essential features are that by means of the slot it holds the needle rigidly at an acute angle with the handles, has its eye-end protected and can therefore be used safely in a confined and deep space, and owing to the slot not being carried to the end of the jaws the instrument can be used both for introducing and withdrawing the needle in the same direction. It can also be used as an ordinary needle-holder. The exhibitor has used the instrument over ten years and has found it valuable in vaginal hysterectomy, ovariotomy and other operations where ligatures have to be passed deep in the pelvis.



(*February* 3, 1916.)

Three Cases of Labour obstructed by Ovarian Cyst.

By WALTER SALISBURY, B.S.

Case I.—D. S., aged 28, was admitted to Queen Charlotte's Hospital on November 24, 1914, at 2.30 p.m., with a history that she had been in labour six days, in acute pain, the membranes having ruptured two days previously. She was full term in her second pregnancy. On admission the patient showed signs of coming exhaustion, with pulse 128, and powerful uterine contractions were present. Thirty ounces of urine were withdrawn by catheter. The child was dead, and the head fixed in the pelvic brim in the right occipito-posterior position. The os uteri was fully dilated, and a large tense cyst filled up the pouch of Douglas; it lay completely below the presenting part and no attempt was made to displace it. Morphine, hyoscine and atropine were given, and the patient's general condition improved. At 6 p.m., under an anæsthetic, Mr. T. G. Stevens opened the abdomen and lifted the uterus outside. A dermoid cyst of the left ovary, the size of an ostrich's egg was withdrawn from the pelvis with some difficulty, rupturing in the process. The cyst was removed, the uterus replaced in the abdomen, and the fœtal head pushed into the pelvic brim. The patient was then placed in the lithotomy position, the occiput manually rotated to the front, and a dead child weighing 8¼ lb. was delivered without difficulty with axis-traction forceps. The abdominal wound was then closed and the patient made an uninterrupted recovery.

I consider that the method here adopted was simpler and safer than Cæsarean section. The cervix and the contents of the amniotic sac were suspected of infection; and the risk of conveying this to the peritoneum was abolished, and that of conveying it to the placental site was lessened, by delivering *per vias naturales* and then expressing the placenta.

Case II.—J. O. H., aged 26, mother of three children, was confined in her own home in Queen Charlotte's District on January 2, 1915. The midwife in attendance felt a mass behind the vagina and the fœtal head high up in front in the first vertex position. Strong pains were present. Medical aid was at once sought, but when the District Medical Officer arrived at about 4 a.m., a living child, weighing 7¼ lb., had been born, and the pelvic mass had disappeared. The patient vomited once, had a pulse of 116, and some abdominal pain. The duration of the first stage of labour was reported as twenty-two hours, and the second stage one and a half hours. During the day the patient had felt comfortable, but was sent into Queen Charlotte's Hospital at 9 p.m. On admission the patient felt more comfortable. She had, however, a pulse of 108, and definite tenderness on deep pressure over the lower abdomen; there was some distension, but no rigidity and no dullness. She had an anxious expression and lay very quiet. At 9.45 p.m. the abdomen was opened by Dr. J. B. Banister. A quantity of serum, blood and mucoid material was present in the peritoneal cavity. A semi-solid multilocular cystic adenoma of the left ovary, weighing 2½ lb., was found to have ruptured, and one loculus was still lying in the pelvis. The cyst was removed and the free fluid mopped up, and a further quantity was drained away through a tube during the following twenty-four hours. The patient made an uninterrupted recovery.

If this case had been seen while in labour, it could have been readily dealt with by removing the tumour and then delivering with forceps, as in Case I.

Rupture of the cyst during labour is not very rare: Munro Kerr gives the frequency as 13 per cent. In the above case the cyst appears to have ruptured easily, and there were very few symptoms afterwards to suggest a catastrophe, so that even with a pulse of 116, falling to 108, the *nature* of the condition might have been overlooked had not a suggestive history been furnished by the midwife. Munro Kerr records a case in which a cyst was ruptured during delivery by forceps and the condition *was* overlooked for five days, after which an operation failed to save the patient.

Case III.—J. M., aged 30, was sent up to Queen Charlotte's Hospital on November 20, 1914, at 6 p.m., as labour was commencing and her doctor had felt two polypi in the vagina. The patient had two children and was now at full time in her third pregnancy. On admission she was having occasional pains, and the child was alive and presenting as a first vertex. Abdominally, a small cyst of the left ovary was found to move freely over the left surface of the uterus. A vaginal examination revealed two polypoid tags of the cervix, the size of cherries, adjacent to old scars, and dilatation had not commenced. In the pouch of Douglas there was a densely hard angular mass the size of a hen's egg which was continuous on the left size of the pelvis with a soft cyst. The mass was immovable and was diagnosed as a dermoid of the right ovary. Dr. R. D. Maxwell saw the patient the next day, and on the following morning performed abdominal section. Although labour appeared to have passed off, a quantity of liquor amnii escaped three hours before the operation. The pelvic mass was not very accessible, so Cæsarean section was performed and a living child weighing 8½ lb. was delivered. The pelvic mass proved to be a dermoid of the right ovary the size of a coco-nut and it was afterwards found to contain a mass of bone and three teeth. A dermoid of the left ovary was also present, though above the pelvic brim. Both cysts were completely removed, and the patient made an uninterrupted recovery.

Cæsarean section was probably the simplest and safest method of treating this case, as the cervix was undilated, and there was no reason to suspect any infection of the uterus. Of the many other methods of treating this and similar cases, two may be briefly mentioned. One is to perform ovariotomy, close the abdomen, and then allow labour to proceed. This, however, throws a severe strain on the abdominal wound, and is very distressing to the patient. The other method is to leave the patient in labour, under careful observation, until the os uteri is fully dilated, then remove the cyst by laparotomy and immediately deliver by forceps or version. This may be the safest treatment under certain conditions—e.g., when the uterus is infected and the os already partly dilated. In certain cases seen late in pregnancy the induction of labour has been suggested, to be followed by the adoption of this method. It has, however, two disadvantages: firstly, the obstruction will frequently lead to premature rupture of the membranes and unsatisfactory dilatation of the os; and secondly, the cyst may rupture before the laparotomy has been performed.

In conclusion, therefore, I think that a case seen towards the end of pregnancy or early in labour is most safely dealt with by Cæsarean section; whereas if it is seen late in labour, especially if the uterus be infected, the safer course is to turn the uterus out of the abdomen, remove the cyst, and deliver the child *per vias naturales* before closing the abdomen.

Finally, I wish to express my thanks to Mr. Stevens, Dr. Banister and Dr. Maxwell for their kind permission to report these cases.

Dr. HERBERT SPENCER: I am naturally glad to find that the treatment of the first case is considered the best, for this method of treatment was brought before the Obstetrical Society of London by me eighteen years ago; yet, in spite of my frequent criticisms, many unnecessary Cæsarean sections in the meantime have been performed in such cases. I think it is time they ceased. With regard to the third case there will be differences of opinion as to what should be done in labour when the os is not dilated, whether one should wait till the os dilates or whether Cæsarean section should be the line of treatment. There is another method of treatment which has not been mentioned by the author which is much better than either—namely, pushing up the tumour in the Trendelenburg position, which Bossi showed twenty years ago to be quite easy in this position even when impossible without its aid. I think the knee-chest position under anæsthesia might be still more efficacious. In any case it should certainly be tried before resorting to Cæsarean section. I have a slight criticism to offer on the description of the size of the tumour in this case, which is said to be that of a coco-nut. It is of some importance in the case of ovarian tumours obstructing labour to know the exact size of the tumours, and, however convenient during clinical examination the likening of the size to that of familiar objects may be, tumours removed by operation should have their dimensions accurately given in inches or centimetres.

(*February* 3, 1916.)

A Case of Fatal Rupture of the Bladder during the Puerperium.

By FRANCES M. HUXLEY, M.D.

MRS. W., aged 26, a primipara, was confined on December 21, 1914; vertex presentation; occipito-posterior position. The doctor was called in on account of delay in the second stage of labour, due to the occiput being posterior to the right, and he applied forceps, after leaving the nurse to catheterize the patient. (It transpired later that the catheter was not passed, but the patient "made water herself.") Delivery was effected by forceps with some difficulty. A perineal tear was stitched. The puerperium went on uneventfully until December 29, the ninth day, when, on making a sudden stretching movement of the right arm (the patient was nursing her baby on the left arm and stretched the right out of bed to the floor to pick up something), she was attacked with severe abdominal pain, vomiting and collapse. Dr. Cuthbert Lockyer saw the patient in consultation the following day and sent her immediately to the Samaritan Free Hospital.

On admission, at 11 p.m. on December 30, the patient looked extremely ill; the face was pale, but not pinched; the extremities were cold and clammy; temperature 102·2° F.; pulse running; respirations 28; tongue dry and bright red. The knees were not drawn up. The abdomen was very markedly distended, symmetrical, and moved with respiration. It was neither very rigid nor very tender. There was dullness over the symphysis pubis and in the flanks, and the presence of free fluid was determined. No pelvic examination was made on admission. The patient stated that she had passed no urine since the onset of the acute illness (i.e., for about thirty hours), so she was catheterized, 40 oz. of acid, somewhat offensive urine being withdrawn. Catheterization was repeated at 8 a.m. on December 31, and 35 oz. of urine were withdrawn. In spite of stimulant treatment the condition became gradually worse and the patient died at 2 p.m. on December 31.

A post-mortem examination was made on January 1, 1915, by Dr. Braxton Hicks. On opening the abdomen an odour of urine was noticed, and two to three pints of turbid urine and peritoneal exudate escaped. In the hypogastric region, the bladder was adherent to the anterior abdominal wall, and the posterior part of its fundus adhered to the anterior surface of the uterus. The whole bladder wall was very thin and had obviously been much distended recently. At the summit of the fundus of the bladder was a horizontal slit, 2½ in. in length, through which the urine had escaped. The edges of the slit were jagged and sharp, and showed no signs of sloughing or bruising. There were signs of general peritonitis. Death was due to toxæmia and cardiac failure produced by general peritonitis, the result of rupture of the bladder into the peritoneal cavity.

The questions arising from this case are, firstly, *when*, and secondly, *why*, rupture of the bladder occurred?

I think there can be little doubt but that the rupture was spontaneous, and took place when the patient made the sudden stretching movement already described, on the ninth day of the puerperium, because the onset of symptoms was acute and the patient's state was said to have been quite satisfactory until then.

The question *why* is more difficult to answer. Examination of the bladder showed no reason why it should have given way at the particular point it did; there was no evidence of any necrotic process, simply a slight submucous hæmorrhage due to the tear.

I suggest that the explanation may be as follows: Forceps were applied to the fœtal head when the bladder was distended, producing increased pressure on its walls and bruising of its base and of the urethra. This produced atony of the bladder, so that the state of distension was never overcome, the patient only partially emptying the bladder. The sudden movement took place at a time of extra distension, and the strong contraction of the abdominal muscles was sufficient to produce rupture.

I have searched the literature for similar cases, but find only one that has points of resemblance. This is a case described by Gentles[1] in 1883, and is of interest, since in it rupture of an uninjured bladder took place as a result of muscular action:—

Mrs. T., aged 36, a multipara and an alcoholic subject, was known to suffer from occasional retention of urine. She aborted at three months and from this time developed acute abdominal symptoms, resulting in death thirty hours afterwards. Rupture of the bladder was found to be the cause of death, and was considered to have occurred as the result of expulsive labour pains on a full bladder.

DISCUSSION.

Dr. CUTHBERT LOCKYER: I have little to add to the account of the case given by Dr. Huxley; I agree that the clinical history points to a *spontaneous* rupture of the bladder and not to direct trauma produced by the blade of the forceps upon a full bladder. The woman was in a dying condition when I saw her on the day after the onset of sudden collapse and pain; she was removed to hospital in compliance with the urgent wish of her husband. I was present at the autopsy and noted that there was no sign of bruising nor of sloughing. The extremely thin edges of the laceration were scarcely discoloured and were not ragged. The entire bladder wall was markedly attenuated, and the viscus enormously distended, so much so as nearly to cover the entire anterior uterine surface to which it was adherent. The fact that the ruptured bladder could retain as much as 40 oz. of urine may be partly explained by the viscus being adherent to the parietes in front and to the uterus behind, as this might leave only the overflow from a *full* bladder to escape through the fundal tear.

Dr. AMAND ROUTH: May it not be possible that the muscle of the bladder was torn during the forceps delivery when the bladder was full, and that the peritoneal covering only yielded immediately previous to the acute symptoms when septic peritonitis so suddenly occurred?

Dr. MCCANN: Was a microscopical examination of the bladder wall made? for on looking at the specimen the bladder wall seems to me to be attenuated at the site of the rupture. From the position of the rupture it is difficult to furnish an explanation of the cause.

---

[1] Gentles, T. L., "Case of Rupture of the Female Bladder associated with Abortion," *Brit. Med. Journ.*, 1883, i, p. 8.

(*February* 3, 1916.)

Chorionepithelioma following Vesicular Mole.

By M. HANDFIELD-JONES, M.D.

MRS. H., aged 49. Married at the age of 18; mother of six children, the last born thirteen years ago; also two or three miscarriages between her fifth and sixth pregnancies. Twenty years ago she developed a hydatid mole while living in New York. This growth was removed, and no ill results followed. Her general health has been excellent, and beyond some trouble with deafness everything has been quite normal. Menstruation has always been quite regular and normal, but she saw no monthly loss in May or June, 1915. I saw her on July 21, in consultation with Dr. Darwin Hay, and she then mentioned that some brownish-red loss had been going on for about ten days, and that for the last forty-eight hours recurrent pain had been present in the pelvic area, and uterine hæmorrhage had been severe. The patient is a stout, well-developed woman, but looks rather blanched and anæmic. Dr. Hay reports that during the last two days there has been considerable hæmorrhage with clots, and that yesterday some masses of hydatid mole were expelled.

Abdominal examination showed that the uterus was enlarged to the size of a four and half months' pregnancy; also that the uterine tumour seemed to be of a doughy consistence, and was wanting in elasticity.

Vaginal examination showed that the cervical canal was patulous, and that the lower uterine segment was distended and wanting in mobility. It was agreed to give chloroform next day and explore the uterus.

July 22, 1915: Nurse reports that this morning more masses of hydatid mole were expelled, but unfortunately she did not keep these for our inspection. The womb was still much enlarged, and reached half-way up to the umbilicus. Under the anæsthetic a good deal of shreddy tissue and clot were removed, and the lower part of the uterus was curetted. The upper zone was not scraped, as perforation of the uterine wall was feared. The cavity of the womb was brushed out with iodized phenol, and a gauze packing inserted into the lower uterine segment.

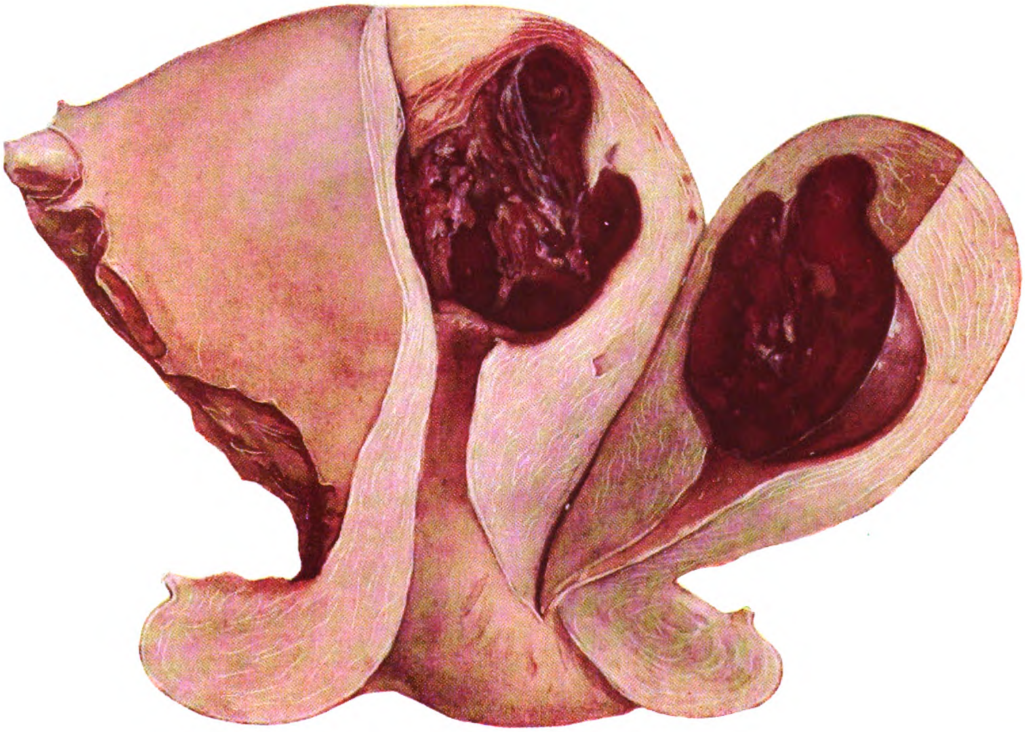
Microscopic examination of the pieces of tissue removed showed that they consisted mainly of decidua mixed with blood-clot. There was considerable leucocyte infiltration, but no chorionic villi were found, and there was no sign of the mole, which in all probability had been completely shed. The tissue was innocent.

For three weeks from the time of this exploration the patient made good progress. The uterine discharge had practically ceased, and there was freedom from pain or discomfort. Then, apparently without reason, hæmorrhage began again, and after this had continued between a fortnight and three weeks I was asked to see the patient again in consultation. The womb, which had shrunk down markedly, was now beginning to enlarge again, and bimanual examination showed that it was about the size of a three months' pregnancy. As the patient was beginning to get blanched again, and there seemed very little doubt that some active mischief was going on in the uterus, it was decided to perform total extirpation of the womb. This was done on September 10. At the operation the womb was found to be freely movable; there was no evidence of extension of disease into the broad ligaments, and except for slight cystic degeneration of the left ovary, there was no disease of either tube or ovary. When the uterus was cut open along its anterior surface after the operation, it was found to be filled with a large gelatinous blood-clot, of a very pale colour. This clot was lying free in the uterine cavity, and seemed to be formed by oozing from a growth which occupied the posterior wall of the uterus, high up and rather to the left.

Report.—Projecting from the posterior aspect of the left cornu of the uterus was a rounded mass about the size of a walnut. It was of a dark red colour and attached by a broad base to the uterine wall. A section through it shows that the tumour invades the myometrium to a considerable depth, leaving only about ⅓ in. of uninvaded muscle, the whole forming an ovoid mass of hæmorrhagic appearance. A complete slice was removed, including the whole section of the tumour and underlying muscle. Sections were cut from this for histological examination.

Histological Report.—The bulk of the tumour is composed of blood-clot and necrotic tissue. This is intersected in several places by strands and islets of new growth, which is composed of three main types of cells: (1) Large irregular cells with big degenerate nuclei; (2) smaller well-defined polyhedral cells closely packed in solid groups; (3) irregular masses of protoplasm containing several nuclei. All these elements are mixed up together in large masses and are to be seen permeating the muscle planes. The growth is a chorionepithelioma.

PROC. ROY. SOC. MED.
Vol. IX. No. 5.
Obstetrical and Gynæcological Section.



HANDFIELD-JONES:
Chorionepithelioma following Vesicular Mole.

So much has been written regarding the clinical aspect and pathology of chorionepithelioma that it is quite unnecessary to discuss this case in detail; but there are one or two points on which I should be glad to secure the experience of members of our Section to-night.

(1) With what degree of frequency does hydatid mole occur more than once in the child-bearing history of any woman? Personally, I can only remember three or four other cases where this degeneration of the villi has occurred in more than one pregnancy.

(2) What is the earliest period at which well-marked chorionepithelioma is found to be present after the expulsion of a mass of hydatid mole?

(3) Does this disease perforate the wall of the uterus with any degree of frequency *before* expulsion through the vagina of the main mass?

Of course it is well known that this catastrophe does occur. There is a specimen in one of the hospital museums of London, which shows a uterus full of hydatid mole and the chorionic villi protruding through a hole in the fundus of the uterus. Also cases have been published where the abdomen has been opened owing to acute symptoms, and peritonitis due to the perforation of the uterine wall by this growth has been found.

(4) What constitutes the difference between malignant hydatid mole and benign cystic degeneration of the chorionic villi?

It is on this last point that I should specially desire to have opinion of Fellows of our Section who are experts in pathology. The following case may be of interest in discussing this point:—

Madame G., aged 40, was seen by me on February 10, 1915, with her medical attendant, Dr. Nicholson. She stated that her last regular period occurred in October, 1914, but there had been some red loss in the end of November. For the last two or three weeks she had had constant discharge of blood *per vaginam*. She believed that she had fallen pregnant in October. Abdominal examination showed that the womb was enlarged to the size of three months' pregnancy, but its consistence was more solid and doughy than would be found in a normal pregnancy. After watching the case for a few days, hæmorrhage came on, and a mass of hydatid mole was expelled. This was examined at the laboratory, and the following report was sent to me:—

Report.—The specimen was a large, irregular blood-stained villous mass, some of the villi being dilated into small cysts attached by a thin stalk. There were also masses of blood-clot mixed up with the specimen. Sections were taken from three different parts of the mass. Histologically it displays the structure of a hydatidiform or vesicular mole. The stroma of the chorionic villi is œdematous, and in numerous cases these latter are actually cystic. From the surface of many of them project solid groups of proliferated Langhans' cells and irregular buds of syncytium. Mixed up in the blood-clot is some necrotic tissue in which are to be found similar groups of cells and syncytium, and also some gigantic cells with single large nuclei. The absence of any muscle tissue renders an absolute diagnosis difficult, but the appearances are highly suspicious of syncytioma malignum.

On the strength of this report I felt it would be wise to extirpate the uterus, and I suggested this to the family physician and to the patient. The patient, however, declined all surgical interference, and so far she has shown herself right, for up to the present time her health has been normal, and there has been no evidence of progressive mischief in uterus or other tissues.

The question naturally arises whether there is anything in the naked-eye appearance of a hydatid mole or in the microscopical characters which would enable one to judge whether the patient was in danger of malignant changes. The eroding powers of the chorionic villi are well recognized by every pathologist, but the question of the resisting power of the uterine wall has received less consideration. I would suggest for discussion to-night the relative value of these two factors in the production of chorionic epithelioma.

DISCUSSION.

Dr. AMAND ROUTH: Thirty years ago it was thought that if a woman had a hydatidiform mole she would be likely to have a recurrence if pregnancy again occurred; I have, however, never known of a woman having such a recurrence. I agree as to the difficulty of detecting pathological evidence of malignancy in a hydatid mole, and also of detecting the degree of malignancy in chorionepithelioma, so as to be able to decide in what cases it is justifiable to remove the uterus if the lungs are already attacked, or where it is hopeless to interfere.

Dr. CUTHBERT LOCKYER: It is an interesting and unusual fact that one of the patients mentioned by the President twice passed a vesicular mole. It is singular that I have had experience of similar instances; an account of these, it is hoped, will be placed on record. I have met with six cases of vesicular mole in private practice during eighteen years, and have seen a similar number in hospital. In none of these women has the condition been recurrent, though several have subsequently borne healthy children. In reply to the question as to how soon malignancy may supervene after the expulsion of a mole, I may state that I have seen three early cases; in one malignancy (as evidenced by deep intramuscular invasion) was present twenty-one days after the mole was expelled, in another five weeks subsequent to that event, whilst in the third the malignancy was proved after two months. In each of these three cases a very interesting point was demonstrated—viz., that the mucous membrane showed no evidence of tumour formation, and that the tumour formation was only discovered by making multiple sections through the muscle walls. As to the question of the naked-eye and microscopic differences between a benign and an innocent mole, there would appear to be nothing in the macroscopic characters to aid in differentiation, whilst microscopic evidence would be based on proving invasion of the uterine muscle by chorionic derivatives. I have known this test fail, however, for in two instances in which degenerate muscle-bundles showed the presence of wandering syncytial cells, in one there was no sign of malignancy in the uterus removed by hysterectomy, while in the other nothing was done, and the patient is now well after two years. Both cases suggest that embolic foci of chorionepithelioma may clear up. That this remarkable growth does disappear in certain cases is well known. I have helped my colleague, Dr. Roberts, to remove a chorionepithelioma from the vagina, and there was no recurrence after several years. On the question of the "resisting power of the uterus" to chorionepithelioma, if such exists, nothing whatever is known.

(*February* 3, 1916.)

PRESIDENTIAL ADDRESS.

If you consult the laws of the Royal Society of Medicine, and turn to the chapter which deals with the Section of Obstetrics and Gynæcology, you will see that the duties of the President are enumerated as follows:—

> (1) "He shall preside at and control all Meetings of the Section and of the Council of the Section; he shall state and put questions, admit members, interpret the Laws, and decide every doubtful question. He shall maintain order and enforce the observance of the Laws of the Section. He shall sign the minutes of all Meetings of the Section and of the Council, as a voucher for their accuracy, after they have been approved by a majority of votes."
>
> (2) "He shall have a second or casting vote."
>
> (3) "He shall return the thanks of the Section to contributors of communications and to donors of presents."

While there are the written directions for his guidance, tradition has also established three other duties which he is expected to fulfil on taking office. In the first place he shall render thanks for the great honour done to him; secondly, he shall confess his own sense of humility and doubtful fitness for the post; and thirdly, he shall unburden himself of certain utterances which it is usual to term "A Presidential Address"—i.e., a learned discourse which really may vary between a semi-scientific paper and a political sermonette.

It has been well said that anyone who studies the back numbers of that valuable periodical known as *Punch* will, from the cartoons alone, gain a useful knowledge of the most striking historical events of the last century. The same might be said of a study of the various Presidential Addresses as set forth in the volumes of the *Obstetrical Society's Transactions,* for here one sees recorded the various struggles of the scientific and political life of our profession. In one address the obstetrical demands of medical education are fully dealt with. In another the failures of that unhappy institution known as the London University are severely dealt with. In another the disgrace of puerperal sepsis is held up to view; and in others the prevailing topics of the day are fully discussed. Now it is quite clear that all these interesting subjects cannot be spun out indefinitely, and the time must come when it is extremely difficult for an incoming President to discover any subject which can be dealt with in a novel manner. I think this lack of subject-matter must have been severely felt by one of our past Presidents, Dr. Herbert Spencer. In the volume of the *Proceedings* which records his utterances from the Presidential Chair, I find that he was weary of past efforts, and turned to that illustrious essayist, Francis Bacon, in the hope of advancing our knowledge. In a charming sermonette he severely chastised the want of originality and primary learning among the members of our Section, and showed how Bacon's "inductive method—accumulation of systematic analysis of isolated facts to be obtained by observation and experiment—formed the basis of modern scientific work."

The name of Francis Bacon would naturally suggest to one that kindred spirit and possible identity, William Shakespeare, and with a mind already impressed by Dr. Spencer's successful essay, I turned to my volume of Shakespeare to see if I could get an inspiration for a Presidential Address. The titles of some of the plays were distinctly encouraging; thus, "Love's Labour's Lost" seemed to open the way for a dissertation on the pathology and treatment of abortion; while "The

Tempest" or "All's Well that Ends Well" would form an excellent essay on the causes which led to the separation and final happy reunion of the Obstetrical and Gynæcological Societies. On second thoughts, however, I felt that such a course would lay me open to a charge of plagiarism, and I turned once more to the volumes of the *Transactions* in hope of fresh ideas.

The first Presidential Address delivered to this Society came from the lips of Dr. Edward Rigby, at the first meeting of the Society on January 5, 1859, and I have read that address with close attention, as coming from the first President of our Society. May I quote a short passage from his writing? It is as follows:—

> "When we consider the vast amount of obstetric practice and observation which is daily and hourly going on amidst the huge population in and around London and in the densely peopled districts of the provinces, we shall all feel with regret that an enormous stream of valuable experience has been allowed to run almost entirely to waste for a long succession of years. In saying this, I, of course, do not allude to the more distinguished members of this department of the medical profession who have zealously availed themselves of those rare opportunities of observation and of gaining extensive experience which have been afforded them by their hospital and consultation practice, and whose valuable writings, whether in separate works or in the medical journals of the day, we all gratefully acknowledge; but I allude more especially to that numerous body of our brethren extensively engaged as general practitioners, who spend long and active lives in the practice of midwifery, and who would undoubtedly be able, through the medium of a society like this, to contribute inexhaustible stores of obstetric experience of the highest interest and value, and which, but for such an opportunity, have hitherto remained uncommunicated, and therefore lost to the main body of the profession. I believe, therefore, that I am not only expressing my own opinion but that of the gentlemen who have promoted the formation of this Society, in saying that we shall look with especial interest to the general practitioners for the extensive results of their obstetric experience, which must necessarily be of great interest as well as value.
>
> "Do not imagine that I wish, in the slightest degree, to undervalue the experience and learning of those of our brethren, whether in the provinces or in the metropolis, who honourably hold a high position in obstetric science; I know we may surely count upon them as valuable contributors; but, at the present moment, I address myself more especially to our brethren in general practice, because I conceive that it is chiefly from the want of such a society as this that there has been no opportunity for collecting those stores of obstetric observation and experience which we may hope to receive from them."

Again, in 1883, Dr. Matthews Duncan, in his Presidential Address, writes as follows:—

> "Possibly, the more frequent appointment of committees to receive evidence, sift cases, conduct investigations, and prepare reports for transmission to the Society might do something, and perhaps much, towards settling some of the points on which these differences of opinion exist—differences of opinion from which, I am afraid, our clients and ourselves must both necessarily suffer. The principle of collective investigation, again, of which much use was made by us in the report drawn up during Dr. Hewitt's presidency on the subject of infantile mortality, might be adopted in regard to many subjects with distinct advantage. From such a body of practitioners as constitute our Society methodical reports on matters of common interest could, I believe, without difficulty be obtained, and such work would, indeed, form a fresh link between Fellows living at a distance and the Society of which they form so important a part."

Surely these words of our first President are worthy of our careful consideration; for I hold that every member of a medical society is bound, by his membership, to advance medical knowledge and research work quite as much as to absorb the teaching and experience of others.

One has only to look at the programmes of our medical societies to see that the mass of the papers are written by hospital physicians and surgeons, and that very few are contributed by the family physician. In fact, beyond occasionally taking part in the discussions which follow the reading of these papers, very, very few of the average members contribute anything towards the work of the Section. I know it is argued that the family physician is too much occupied with the cares and worries of daily practice to have time for writing communications to societies. Also, it is argued that the average practitioner does not see a sufficient number of cases to be able to write at length upon a subject. Now, the first argument can hardly hold water; for I doubt if any member of our Section is harder worked than are Dr. Amand Routh, Dr. Herbert Spencer, or other gentlemen who have provided subject-matter for us during the past sessions. As regards the second argument there is more to be said, but I would like to suggest to-night that there is a way even out of that difficulty. Why should not a clinical committee be appointed by the Section, which might select certain subjects on which information is desired? Then a printed notice might be sent to each member of the Section, asking that he would contribute the notes of any case of such nature which had come under his immediate care. An enormous amount of clinical material is lost to us because the family physician does not think it worth while to bring forward the notes of a solitary case. Let me illustrate my meaning by pointing out some of the conditions on which information from the members of our Section would be greatly welcomed. How little we know of the latency of tubercle during the course of pregnancy, and yet this is a subject about which the general practitioner ought to be able to supply a large amount of evidence. There is a prevailing belief that tubercle delays its ravages during the course of pregnancy, but there is very little evidence before us to prove whether this is truth or fallacy. It might interest the meeting to-night if I communicated two cases on this point which have been brought under my notice:—

Case I.—Mrs. S. T. was confined with her second child after a pregnancy which offered few features of interest. Though by no means robust, there was nothing in her condition, while carrying the infant, that needed the care of her medical adviser; the labour was in all respects a normal one, though somewhat tedious. At the end of the first week of the puerperium she began to have slight shivering attacks and rises of temperature, accompanied by nocturnal perspirations. Though there was nothing definitely septic about the lochial discharge or the condition of the uterus, still it was thought that the pyrexia depended on some uterine sepsis; and, as intra-uterine lavages of perchloride of mercury failed to reduce the temperature, the uterine cavity was curetted. The small operation produced no good effect. Large doses of quinine and iron were ordered, but, in spite of these remedies, the temperature continued to rise, and the patient continued to lose ground. At the end of some three weeks a consultation was held, and then, as no disease could be located in the pelvic area, the chest was carefully examined by a physician, who at once detected a large cavity formed in the apex of the left lung. My friend, who gave me the notes of this case, was struck with the absence of all symptoms telling of pulmonary tubercle during the course of the nine months' pregnancy.

Case II was under my care at St. Mary's Hospital, and it is of such interest that I gladly bring forward the notes. Mrs. A. C., aged 29, had given birth to six children. When in labour for the seventh time it was found that the child was lying in the transverse position, so she was moved into a lying-in hospital, where version was performed and a stillborn child was delivered. Previous to her confinement she stated that her health was good, with the exception of a cough, which troubled her somewhat during the last two weeks of her pregnancy. The puerperium was normal for the first ten days, then a slight rise of temperature was noted. On the fourteenth day after labour the patient insisted on leaving the lying-in hospital, and for a week she remained at her own home fairly well. On the twenty-second day after her labour she became semi-unconscious, and remained so until five days later, when she was admitted to St. Mary's Hospital. Three days later she died. Now, I need not trouble you with full details of her clinical condition during the three days while she was in the hospital, except to note that cultures taken from the uterine cavity showed the presence of streptococci and staphylococci. The real interest lies in the notes of the post-mortem, which was made by Dr. Spilsbury, and they run as follows: "Body of a fairly well nourished woman. Brain: General flattening of cerebral convolutions; meningeal blood-vessels everywhere somewhat injected; in interpeduncular space and upon inferior surface of pons, marked signs of meningitis (thickening of pia and arachnoid with semi-translucent lymph); few miliary tubercles over inferior surface of frontal lobes; lateral ventricles much distended by clear fluid; no abscess. Lungs and pleuræ: There were old adhesions over backs of both lungs; surface of both lungs showed miliary tubercles and pleuræ; on section, both apices and right base showed aggregated miliary tubercles; hypostatic congestion and œdema at both bases. (Heart: Myocardium soft and rather pale, cavities somewhat dilated.) There were small fibro-caseous nodules in some regions as aggregated miliary tubercles; no large caseous areas nor cavities were found. There was no catarrhal pneumonia and no calcareous masses. Glands: At bifurcation of trachea were enlarged and pigmented, but showed no tuberculosis. Liver: Size and surface normal; on section, commencing patchy nutmeg congestion. Spleen: Size normal; on section, organ was firm and fibrotic, it was also congested. Kidneys: Left—localized area of tubercular pyelitis; contents of pelvis thick and blood-stained, also a caseous area in cortex; left suprarenal normal. Right—normal, but right suprarenal caseous. Alimentary canal: In lower 18 in. of ileum several tubercular ulcers and miliary tubercles; no ulceration in large intestine; mesenteric glands normal. Genital organs: Ovaries and Fallopian tubes normal; uterus enlarged to size of two and a half to three months' pregnancy; peritoneal surface normal; wall thick and firm and white; inner surface generally smooth and pale; tiny deposits of clot in inner surface; cervix widely patent. Vagina capacious, otherwise normal. Ureters normal. Bladder: Intensely blood-stained; the trigone shows a little superficial ulceration; the contents consisted of deeply blood-stained urine with a fairly large mass of soft clot. The microscope showed many giant cells in the lungs."

These two cases could be multiplied a hundredfold, probably, if pains were taken to collect clinical evidence on the subject, and a perfected knowledge of tubercle in relation to pregnancy, with special regard to its latency, would be gradually built up.

Again, there is much need for a more extensive knowledge of the value of scopolamine in midwifery, not so much as regards its efficiency in soothing the pangs of labour, but rather as regards its drawbacks and dangers. Journalistic enthusiasts have plied the pen of the ready writer in praise of twilight sleep, but we want to know from many general practitioners why the drug is so slow in finding favour, and what disadvantages they have to record against its more general use.

To-night I am anxious further to prove my point by bringing under your notice the subject of the double uterus. Many practitioners regard the condition as a freak of Nature, with little practical bearing on diagnosis or treatment. They have never seen a case, and they never expect to see one. Now I want to show how mistaken these views are, how frequently such cases occur, and what a very practical bearing they have in obstetric and gynæcological practice. I want to prove, by bringing this collection of somewhat unusual cases before you, that I can, by this method, increase your knowledge and experience on this point.

Every one here is well acquainted with the development of the genital tract, and knows that the uterus and upper vagina are formed by the fusion of two tubes, and that in the normal woman the central septum is removed, so that only one uterus, one cervix, and one vagina are found. In every text-book of gynæcology one finds excellent descriptions of deviations from this perfect plan and of the resulting abnormalities. Thus the uterus may be represented by a mere fibrous cord, or may be infantile in size or form, or, again, the uterus may be bifid, one half of the body corresponding to a perfectly normal uterine body and the other half being rudimentary.

To-night, however, I do not want to deal with any of these pathological curiosities, interesting though their study may be; I want you to recognize that in all my cases the uterine body was double, each half forming a perfect uterus, and each half having a perfect tube and ovary attached to it. The cervix may be single or double, the vagina may be single or duplicate; this will not materially matter in our study of these cases. I will ask you to note one fact here—viz., that these cases of doubling of the genital tract are much more common than most of us fancy, and that many a woman passes through her child-bearing period without her doctor having any idea of the abnormality. You may find this statement hard to believe, but I shall hope to convince you before long that it is correct. The first example I ever came across was the case of a young married woman, who was brought to me by her family physician. He informed me that the young woman had told him that she was not made like other women, but that on digital examination he had failed to find anything wrong. When I made a vaginal examination with the patient in the ordinary left obstetric position, I also failed to detect any abnormality, but on separation of the labia, one saw at once that there was a definite septum in the median line, and that two perfectly developed vaginal canals were present. Bimanual examination showed that there was a separate cervix and uterus communicating with each vagina. The patient told us afterwards that she had ascertained for herself that there were two separate canals.

I have several times examined patients with a double uterus who have borne children, and yet their own practitioner had not detected any abnormality at the time of birth. One may fairly judge from these experiences that it is comparatively easy to overlook the presence of a double canal, and that the malformation is more common than is usually believed. Perhaps one reason also why the diagnosis is sometimes obscure lies in the fact that the two uteri are often not placed in the same plane, one uterine body being comparatively anterior, while the other lies in the posterior lateral, or posterior plane. Under such circumstances, even with a bimanual examination, the posterior portion can easily escape observation.

There are one or two cases on record where not only the uterus and the vagina, but also the vulva, have been duplicated. In the *Journal of Obstetrics and Gynæcology* for January, 1913, there is a case recorded by Dr. Gemmell and Professor Paterson, of Liverpool, which illustrates this rare condition very lucidly. You will see by the plate which I pass round that a complete double set of genital organs is present, and the fact that the woman bore a child first from one side and then from the other shows how perfect was the development. This malformation must be one of the rarest, as the writers of the paper which I have just quoted could only find one other authentic instance of double vulva.

Having somewhat cleared the way by these preliminary remarks, I now propose to narrate to you my group of cases showing the clinical bearing in each instance, and I think you will agree with me that they form a series which are of real clinical interest.

Case I.—The late Dr. Cundell, of Kew, asked me to see a case in consultation with him, in the following circumstances: The woman, a multipara, had been confined ten days previously with her third child. There was nothing noteworthy, either in the pregnancy or in the child, but the lochial discharge had been profuse from the first, and for the last three days had been offensive. The temperature had risen above 103° F., and the patient presented all the features of septic intoxication. The uterine cavity had been carefully washed out with iodized water, with a temporary improvement of the symptoms, but the patient was drifting into a dangerous condition. Abdominal examination showed that the uterus was unduly big, and that its upper part was irregular in outline. With the administration of an anæsthetic, it was possible to make a more complete examination, and then one found that two fingers introduced through the cervix entered one cavity on the left side, which gave one the idea of an ordinary uterus which had been recently emptied at full term, but on the right side the fingers passed into a smaller cavity, in which was a mass about the size of an apple. With some trouble this mass was shelled out and removed, when it was found to consist of the membranes of an early pregnancy, mixed up with decolorized blood-clot. The mass was offensive, and was undergoing decomposition. After the removal of this mole, a long glass tube was passed up into the smaller cavity, and a copious douche of perchloride of mercury (1 in 1,000) was administered. From this time involution went on satisfactorily, and all the unfavourable symptoms rapidly disappeared.

It was quite evident that the case was one of double uterus with a single cervix, and that the decomposing mass of membranes belonged to a pregnancy in which the vitality of the ovum had been lost at an early stage. Of course it was impossible to say whether both pregnancies had started at the same time, or whether it was an instance of a conception occurring in a double uterus at separate intervals. The case was certainly not one of a womb with a rudimentary horn, for the uterine cavity, in which the mole was lying, was well developed, and seemed quite capable of allowing full-term development. Probably septic particles had made their way into the smaller cavity at, or soon after, delivery, and septic changes had rapidly followed. I think that, without the help of the anæsthetic, it would have been very difficult for even an expert to have felt sure that he was dealing with a condition of double uterus. In her previous pregnancies the labour had been perfectly normal, and the doctor in charge had no idea of the unusual condition of the uterine cavity.

Case II.—Mrs. P., a multiparous woman, had missed two monthly periods, and thought herself pregnant. Recently, however, a rather copious red loss had commenced, and the patient's doctor had put her to bed, hoping to avert what seemed to be threatening abortion. As the bleeding continued for several days, and the womb was enlarged to the size of two months' pregnancy, or rather more, the patient's doctor asked me to see the case in consultation. The patient was a nervous woman, and the abdomen was somewhat fat, so that examination was not easy, but one could detect a patulous condition of the os and enlargement of the uterine body. As the hæmorrhage continued, it was decided to explore the uterus. When the patient was fully under the anæsthetic a different state of affairs revealed itself. It was now found that there were two separate cervices, and that behind what we had thought to be the sole uterine body was another mass the size of a cricket-ball, which was evidently a second uterine body containing probably a growing ovum. A sound passed into the anterior uterus showed that it measured nearly 4 in. in length, and that the cavity was distinctly enlarged. On passing the curette into this cavity, some fungoid mucous membrane was brought away, but otherwise the cavity was empty. The patient convalesced satisfactorily from the small operation, went to full term, and bore a healthy child.

I cannot help thinking that this was a case of menstruation from one uterine cavity while pregnancy was going on in the other, and it raises the interesting question of the possibility of super-fœtation under such conditions. The case has a distinct interest in connexion with the clinical history already recorded in Case I.

Case III is one of great interest. Mrs. B., aged 36, multipara, had suffered with hæmorrhage from her kidneys for some months, and underwent an operation at a London hospital for the relief of this condition. The state of her urinary tract was considered so unsatisfactory that a decided opinion was expressed advising the avoidance of further pregnancies. In spite of this advice the patient did become pregnant again, and in the month of June, 1911, was found to be two months advanced in pregnancy. In the end of July, 1911, her doctor dilated the cervix under an anæsthetic, and with the ovum forceps removed two fœtal sacs (twin pregnancy), which were advanced to about the tenth week of utero-gestation. In October, 1911, the patient noted that her abdomen was steadily increasing in size, and she felt sure that she had felt quickening about four weeks previously. On October 20, 1911, I met her doctor in consultation, and he pointed out to me how completely the uterus had been emptied, and that a pregnancy was almost impossible. Examination of the abdomen showed that the womb was enlarged slightly above the level of the umbilicus, and fœtal movements could be felt. Vaginal examination confirmed this opinion. Bimanual examination showed that to the left of the uterus there was another body which felt like the enlargement of the uterine fundus, and there could be but little doubt that the patient was pregnant in one horn of a double uterus. There was only one cervix to be felt by vaginal investigation.

The further history of the case was that the patient went to full term and was delivered of a normal fœtus. The interest of the case lies in the fact that the patient must have had a triple conception. On June 22 one horn of the uterus was emptied, but this did not prevent the continuance of the single pregnancy in the other horn. There was undoubtedly rather a comic element in the case, but I need not say that the patient herself failed to appreciate it.

Case IV.—Mrs. X. had been married rather more than four years. Her general health was perfect, menstruation was normal, the loss coming every month and lasting five days. In March, 1907, she missed a poorly time, and saw nothing till the next monthly time was due, then there was a slight red loss, and she had a severe attack of abdominal pain, which necessitated rest in bed and warm applications to the abdomen. Her medical man wrote to me, saying that there was a distinct enlargement on the left side of the womb and that he was sure the patient had conceived in her left Fallopian tube. As the patient was now free from pain and able to travel, he sent her up to me for operation. On examination, I found the uterus enlarged to about the size of a two months' pregnancy, and pushed over to the right side of the pelvis. To the left of the uterus was a swelling rather larger than the normal non-gravid uterus. It struck me that the case was one of double uterus with a single cervix. The doctor and the patient were both so convinced that I was wrong, and that some complication had taken place internally, that I offered to make an exploratory abdominal section to settle the point. To this they willingly agreed, and I opened the abdomen at St. Mary's Hospital, and was able to demonstrate the enlargement of the right uterine body, which corresponded in all respects with a two and a half months' pregnancy. It was equally easy to demonstrate that the swelling on the left side was the other uterine body, which was slightly swollen but evidently did not contain a growing ovum. The rest of the case was uneventful: the patient went to full term, had a normal labour, and a healthy living child.

Case V.—Mrs. H., a primipara, went to nearly full term and then labour began. Beyond the fact that the first stage was unduly long, there was nothing abnormal in the course of the confinement. After the child (which was of small size) was born the doctor noticed that the womb was still large, and he could feel the outlines of another fœtus. On examining the uterine cavity, he found what seemed a thick fleshy septum, or might have been a very thick bag of membranes. As he failed to rupture this with his finger, he introduced a long pair of scissors into the uterine cavity, and endeavoured to open the way into the fœtal sac. He was obliged, however, to desist, as very severe hæmorrhage came on. This was arrested, but returned to some degree next day. The temperature rose, and the patient exhibited symptoms of blood poisoning, and died about the fifth day. Examination after death showed another fœtus lying in the second uterine cavity, and a ragged wound in the septum between the two bodies. Clearly the operator had cut with his scissors into the muscular tissue of the septum, and wounded some fairly large branches of the uterine artery.

Case VI.—The following case illustrates satisfactorily the tendency of this mal-development to produce mal-position in the lie of the fœtus. I attended Mrs. P. in her third and fourth confinements. In her first and second labours she was attended by two different medical men. In both instances the child presented by the breech, and was unfortunately born dead on each occasion. In the third confinement the presentation was again a breech one, but there was a curious thickening to be felt at the anterior aspect of the external os, and on closer examination it was found that there were two separate uteri and two separate cervices. Beyond some delay in the completion of the first stage, the labour ran a fairly normal course, but when the breech was descending it was plain that the second uterus was acting rather as an obstacle in the passage of the child, and some manual assistance was necessary to secure quick and safe delivery. In the fourth confinement the same thing happened, only in that instance the pregnancy took place in the more anterior uterus, and the posterior uterine body was drawn up above the level of the pelvic brim, so that it was not only out of harm's way, but also would have been easily overlooked had one not been acquainted with the malformation. There was no difficulty in the third stage of the labour, and the puerperium ran a perfectly normal course. Perhaps the womb was a little longer in returning to its normal state, but both uteri underwent satisfactory involution, and the patient's convalescence was in no way interfered with.

Case VII.—In quoting the previous cases, I have already called attention to the fact that the two uterine bodies of a double uterus tend to lie anteriorly and posteriorly, and are not in the same lateral plane. Also I have noted that as pregnancy progresses in one cavity, the other body tends to be drawn upwards above the brim of the pelvis, and to arrange itself at a high level, either above the pubes or above the sacral promontory. Now, in the case which I am about to bring before you, something interfered with the usual mechanism, and when labour came on, the cervix of the anterior body, in which the living child was situated, was drawn upwards to a high level, while the empty uterus was pushed down into the hollow of the sacrum and formed a tumour, which effectively blocked the descent of the fœtal head. In these cases I have noticed that the empty uterus grows in sympathy with its fellow, and that it attains a size equal to a gravid uterus at the end of the third month. In the case now under consideration the diagnosis was not made absolutely before operation. The mass which lay in the pelvic cavity, blocking the passage of the head, was thought to be a fibroid or a solid ovarian tumour. It was only when the abdomen was opened, Cæsarean section performed, and the empty uterus delivered through the abdominal section, that the true nature of the case was discerned. Probably in most cases the diagnosis would be made under similar conditions, and the real nature of the obstacle scarcely recognized until the abdomen had been opened.

Case VIII.—Mrs. W., aged 31, has had three pregnancies. The first and the third were perfectly normal, but in the second pregnancy certain troubles arose. I saw the patient when she was four and a half months pregnant, and for the last three months she had had slight uterine hæmorrhage on and off continually. The patient thought herself to be about four months, or rather more, advanced in pregnancy. Abdominal examination showed that the womb reached half-way up to the umbilicus; its tissue was rather flabby and relaxed, and there was an indefinite swelling on the left side of the uterine body. The outline of the uterus's upper border showed a deep indentation, and the tissue was more dense on the left side than the right. Vaginal examination showed that the cervix was deeply split bilaterally, and the endometrium felt thickened and boggy. The recurrent blood losses suggested either the presence of placenta prævia or else an abnormally spongy condition of the endometrium. Regarding the abdominal examination, it was a question whether the denser tissue on the left side of the uterus was a small fibroid or the unimpregnated half of a double uterus. It seemed fairly certain that the patient was four months advanced in pregnancy, and the doctor who had asked me to see the case with him agreed with me that the hard swelling on the side of the uterus was almost certainly an interstitial fibroid, and the view was taken that the presence of the fibroid had increased the vascularity of the endometrium, and was therefore the cause of the irregular blood loss. The sequel of the case showed that our view was wrong, for the patient carried the child up to seven and a half months, and then labour came on and a dead child was born. In the third stage of the labour the placenta had to be removed by hand, and then it was easy to be certain that the case was one of double uterus, with a pregnancy in the right body. Probably some of my hearers may have had similar cases and may have felt equally uncertain whether the diagnosis should be that of fibroid of the womb or of double uterus.

Case IX. — Mrs. C., aged 35, was admitted to Guy's Hospital on March 26, 1914, for Cæsarean section, which was necessitated by deformity of the pelvis. This operation had been performed on two previous occasions. Her first pregnancy was terminated in July, 1907, by craniotomy. Her second pregnancy was terminated in November, 1908, by Cæsarean section, mother and child doing well. In September, 1911, full term of pregnancy was again terminated by Cæsarean section, and the operator endeavoured to sterilize the woman by removal of the Fallopian tubes. The right tube was found and tied off, but the left tube could not be discovered. The patient was very distressed at having become pregnant again, thinking that the last operation had made it certain that no further pregnancy could occur. On March 27, the third abdominal operation was performed by Mr. Bellingham Smith. Operation: The abdomen was opened by a median incision below the navel. The uterus was explored and intestines packed off. It was at once evident that the anterior wall of the uterus was extremely thin in the site of a previous Cæsarean section. Uterine sinuses could be seen bulging through the wall only covered by peritoneum. The wall was incised and the placenta, which was in front, having been rapidly displaced, the child was delivered; the placenta followed. Mr. Bellingham Smith decided to remove the uterus because sterilization had been unsuccessfully attempted at the second Cæsarean section, and the weak condition of the uterine wall might result in rupture in the event of another pregnancy. He then remarked that the left tube and broad ligament appeared to be naturally attached to the uterus, while the right tube was absent. He suggested the possibility of pregnancy having occurred in a bicornuate uterus. On investigating the condition present it was found that a small hard body the size of a goose's egg lay to the right side of the recently gravid uterus, effectively hidden from view by a fold of peritoneum which extended from the posterior surface of the bladder to the rectum. The two horns were removed together by subtotal hysterectomy. The abdomen was closed. Both mother and child made excellent progress, and went out three weeks later. It was found on examination that the woman had a single vagina and one external os; nothing abnormal could be detected.

Case X.—M. E., aged 16, single, was admitted to Guy's Hospital under the care of Mr. Bellingham Smith on September 24, 1906, with the following history: Her monthly periods began when she was aged 14, and were in all respects normal. Her last period came three weeks ago. Pain was first experienced in June, when it lasted a fortnight, but there was no pain for the following three weeks. At the last two monthly periods pain has come on on the first day, and has lasted three days. Abdominal examination: Patient is very tender over the abdomen, and a lump is felt in the right side, extending ½ in. above the level of the umbilicus. The lump seems movable from side to side, but fixed below. It is of firm consistency, but is difficult to examine, as the patient's abdomen is so tender. Operation by Mr. Bellingham Smith. Patient was anæsthetized. Incision made in middle line below umbilicus. Tumour exposed rising out of pelvis with bowel adherent to it. The great omentum attached to the tumour was very dark in colour as though stained with blood. The mass was found to be a bicornuate uterus. The left side was the larger, and the left tube was greatly dilated. On puncturing the tube, treacle-like fluid (which was found to be sterile) poured out. Adhesions between the tube and bowel were separated and a large clot removed from the peritoneal cavity. This clot had to be picked out in pieces as it was very adherent. The left tube and ovary were removed. Abdomen was closed. Patient was then placed in the lithotomy position. A large swelling was found on the left side of the vagina. This was incised, and altered blood was evacuated. The cavity was emptied by irrigation through a douche tube. The patient was then found to possess two vaginæ, the left being imperforate, and a uterus composed of two horns. The patient made a good recovery. On August 2, 1913, the patient was readmitted, complaining of pain at the monthly times. Menstruation was regular and normal in amount, but always associated with pain in the lower part of the abdomen. Abdominal examination revealed nothing abnormal. Vaginal examination showed that the vagina was septate, and at the upper end of each vagina there was an os externum, one lying in front of the other. Operation: Patient was anæsthetized and placed in the lithotomy position. Each cervical canal was separately dilated. It was found that a uterine sound passed 3 in. into the anterior os externum and 2½ in. into the posterior. The dividing septum between the two vaginæ was then excised, a few stitches were inserted, the raw incised surfaces oversewn, and the vagina was lightly packed. Uninterrupted convalescence ensued.

Obstetrical and Gynæcological Section.

President—Dr. M. HANDFIELD-JONES.

(*May* 7, 1914.)

A Case of Glandular Carcinoma of Uterus in a Child, aged 2½ Years.

By JOSEPH E. ADAMS, M.S., F.R.C.S.

(Read by Dr. ATHOLE ROSS.)

HISTORY: For three weeks before admission there had been a discharge of blood from the vagina, steadily increasing in amount and frequency. The child had complained of no pain, but the mother had observed some fullness in the child's abdomen. Bladder and rectum acted normally. There was no history of carcinoma in the family; the father is aged 28 and the mother 25, and this is their first child.

On admission the child looked well nourished and healthy. Both clots and fluid blood were escaping from the vagina. Examination of the abdomen revealed a palpable tumour in the hypogastrium, situated between the bladder and the rectum, partly cystic in consistency. A catheter specimen of urine contained no blood.

Operation on June 18, 1913: Abdomen opened through left paramedian incision: The recto-vesical space was found to be occupied by a rounded cystic growth about the size of half a tennis-ball, which obscured the position of the uterus but was obviously attached to the roof of the vagina; blood and clot escaped from the vagina during the operation. The peritoneum over the tumour was incised and a cystic hæmorrhagic mass was entered and a portion was removed, as it was too adherent for complete removal. The peritoneal covering was then sutured and the abdomen closed. The vaginal hæmorrhage ceased for a few days after the operation but then it reappeared and became more abundant, the bladder had to be emptied by catheter, and there was some blood in the urine; the child gradually lost ground and died on August 24, two months after the operation.

Post-mortem examination: The body was well nourished but showed signs of recent wasting. The peritoneal cavity contained no free fluid, but the bladder was distended with urine, and the coils of intestine were also distended. Occupying the centre of the pelvic cavity was a large growth completely covered by peritoneum, adherent to the posterior surface of the bladder and closely connected with the rectum posteriorly. The operation incision in the peritoneum was firmly healed. Several enlarged mesenteric glands were found and removed for microscopy. There was no evidence of secondary deposits in any of the abdominal organs. Both kidneys exhibited some degree of hydronephrosis. The lungs were broncho-pneumonic, and there were numbers of enlarged glands in the thorax and neck. The pelvic organs were removed entire for further examination.

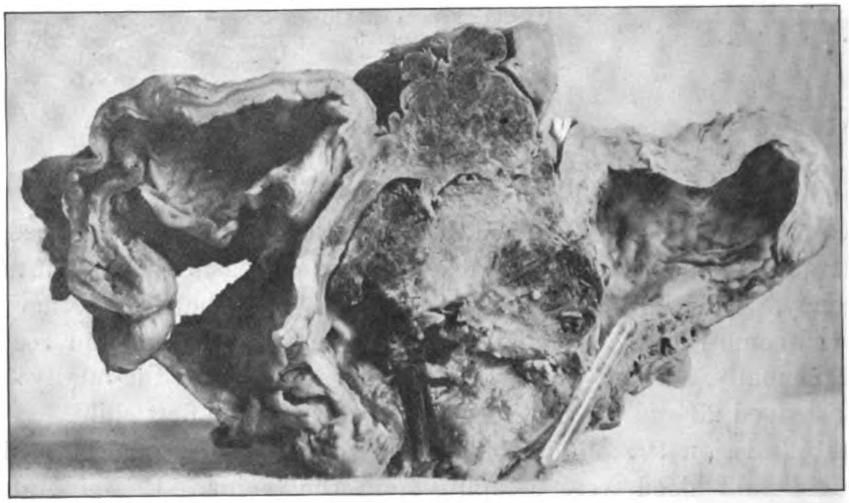


FIG. 1.

Macroscopic specimen: the sections are sagittal, and the bladder lies to the right of the figure.

Pathological Report by Dr. Athole Ross.—Macroscopic appearances: The specimen consists of the uterus and its appendages; the bladder, vagina, and a portion of the rectum. The sagittal section shows that both body and cervix of the uterus are largely replaced by breaking-down growth, which had extended into the recto-uterine pouch and grown into the cavity of the vagina. In each half of the divided specimen the corresponding ovary and tube are present and intact. The tumour shows a network of supporting tissue and a number of areas where hæmorrhage had obviously occurred. At one spot a small portion of growth is seen protruding through the inner wall of the bladder. Microscopical appearances: The growth shows the structure to be a carcinoma with both columnar and cuboidal cells having a somewhat tubular arrangement. It will be noticed that many of these tubules are provided with a capillary and a minimal amount of intervening

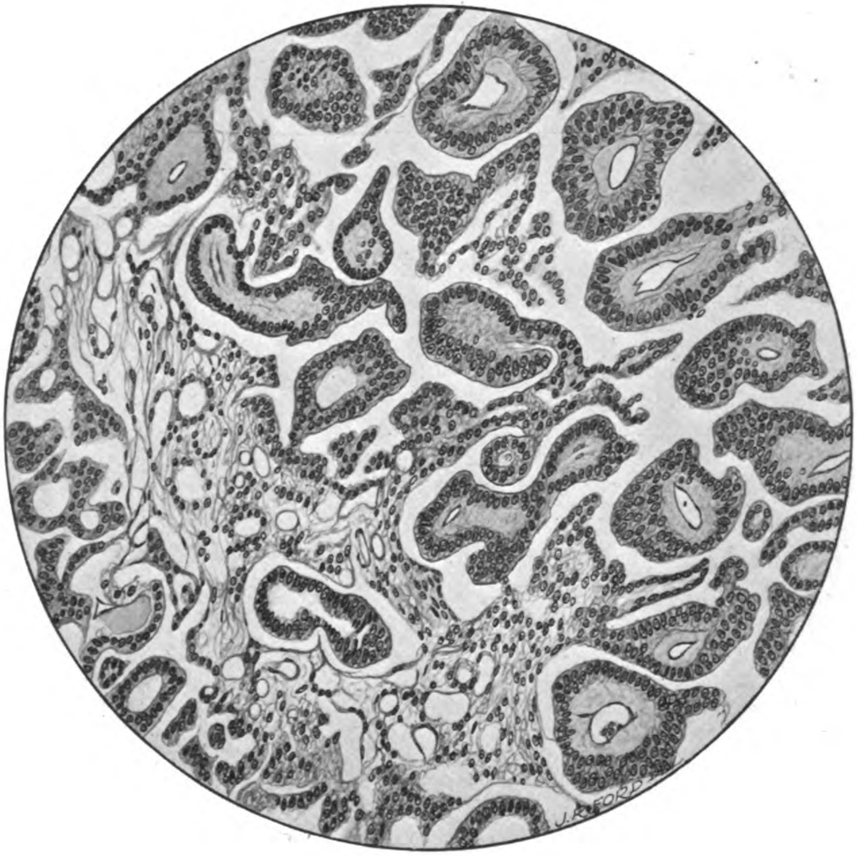


FIG. 2.

Portion of growth showing tubular arrangement of the columnar and cuboidal cells. (Zeiss, obj. B; ocular 8.)

connective tissue. There are many areas of degeneration, and here the tubular arrangement is lost and the cells are grouped irregularly. The interstitial tissue is small in amount. The growth appears to fall into the group of carcinomata arising in the glandular epithelium of the body of the uterus. Examination of the lungs and bronchial glands proved them to be affected with caseating tuberculosis, but unaffected by growth.

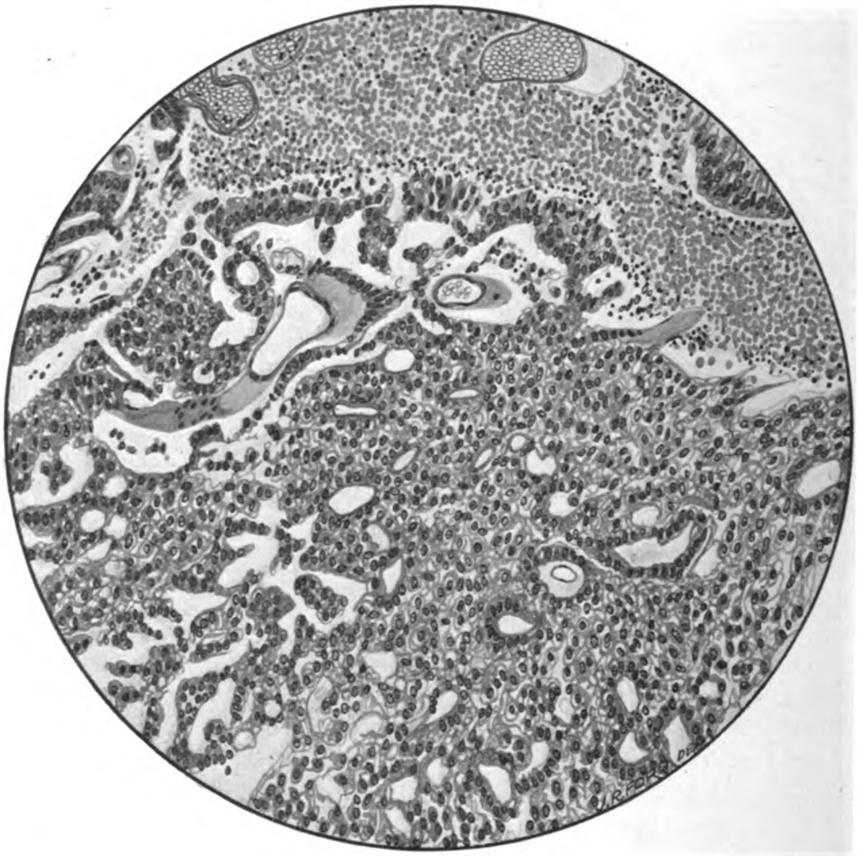


FIG. 3.

A section through the edge of the growth in a more vascular region, where the tubular arrangement of the cells is much less marked than in fig. 2. (Zeiss, obj. B; ocular 8.)

Dr. ATHOLE ROSS: The age of 2½ may possibly constitute a unique record for carcinoma of the uterus. I hope shortly to consult the literature more fully on this point.

Report of the Pathology Committee.—"We have examined further sections of this growth, and having regard to the fact that epithelial pearls, involuntary muscle-fibres, and angeiomatous tissue are seen, in addition to tubules lined by columnar epithelium, we are of opinion that the growth represents a teratoma, and not a carcinoma of the uterus."

(*May* 4, 1916.)

A Fourth Case of Primary Carcinoma of the Fallopian Tube.

By HERBERT R. SPENCER, M.D.

THE following case is the fourth example of primary cancer of the Fallopian tube which has been under my care. The three previous cases have been published in the *Journal of Obstetrics and Gynæcology of the British Empire*, 1910, xvii, p. 30.

E. P., a nullipara, aged 54, was admitted to University College Hospital on June 6, 1913, complaining for the last two or three years of irregular hæmorrhages, which were very severe two months ago; of a watery discharge, sometimes tinged with blood during the last two months; and of great frequency of micturition, which necessitated her getting up five or six times in the night. Menstruation began at the age of 16, was never quite regular, occurring every three or four weeks, and was not altered till the age of 50, after which it became more irregular and profuse; it was never attended with pain.

The patient was fairly well nourished, of a rather pale and sallow complexion, with somewhat prominent eyes, but no fullness of the thyroid. The heart and lungs were healthy, the breasts well developed and normal. The abdomen was distended by a tumour which reached up on the right side nearly to the level of the umbilicus and on the left side to the level of the anterior superior iliac spine. The rounded lobulations of the two sides suggested two tumours, of which the left was more prominent and was hard and tender; there was great tenderness also over the right half, but this was cystic and was thought to be probably a degenerated fibroid. The perineum was intact; the hymen was unruptured, but widely dilated; the cervix was high up above the pubes and behind was a large and extremely tender tumour, mostly hard, but on the left side soft and elongated. The whole mass was fixed by adhesions. The case was thought to be one of uterine fibroids with cystic degeneration of one of the tumours, and probably salpingitis.

On June 14, 1913, the patient was operated on by a median subumbilical incision. The myomatous uterus was exposed, surrounded on the right by a large tumour, which had the appearance of a pyosalpinx, and an ovarian cyst of the size of an emu's egg; to this the appendix was adherent and was therefore divided by the electric cautery between clamps. After separating numerous adhesions to the surrounding parts the whole mass was delivered through the abdominal wound, the ovarian cyst rupturing during the process of delivery and discharging blood-stained fluid. The right ureter was extensively exposed, being displaced by adhesions of its overlying peritoneum, which was cut and afterwards stitched to cover the ureter. After dividing the round and broad ligaments, the right infundibulo-pelvic ligament, and the left Fallopian tube and ovarian ligament near the uterus, the uterus and its attached right ovarian and tubal tumours were removed by Doyen's method. The left tube was slightly thickened but not distended, and the tube and ovary were covered with such dense adhesions that it was thought wiser not to prolong the operation by their removal. A pelvic diaphragm was formed by lacing the ligaments and peritoneum together with a silk purse-string suture after tying all bleeding points with fine silk. A rubber tube was inserted and removed on June 27. The abdominal wall was closed by through-and-through silkworm-gut stitches, buried silk stitches for the peritoneum and fascia, and horsehair for the skin. The duration of the operation was eighty-seven minutes. The wound healed by first intention except the site of the tube. The patient left the hospital with the wound soundly healed on July 11, 1913.

The parts removed (myomatous uterus, ovarian cyst and "pyosalpinx") were described in the notes by the registrar and were kept in formalin solution and used to demonstrate the pyosalpinx, of which, unopened, it appeared to be a fine example.

Nine months later, on April 23, 1914, the patient was readmitted complaining for a month past of pain in the left inguinal region passing through to the hip, and of a lump which she had noticed for three weeks and which was getting larger. A movable hard tumour as big as a duck's egg was found on examination, and was diagnosed as a malignant tumour of the sigmoid. As it appeared probable that this was a recurrence of one of the former tumours, I looked up the record, but finding no note of anything malignant I sent for the tumour, cut open the supposed pyosalpinx, and found it to be full of carcinoma.

Laparotomy was again performed on April 25, 1914, and the growth was excised, with 3 in. of the pelvic colon to which it was growing, and the lumen of the gut restored by end-to-end anastomosis. Before closing the abdomen the cavity was thoroughly explored for further growths, but none was found. A drainage-tube was inserted. The operation lasted seventy-four minutes. The wound healed except for a minute fistula, which discharged a little pus, occasionally stained with fæces. This fistula persisted, but caused very little inconvenience. The patient left the hospital feeling very well on May 25, 1914.

On October 15, 1914, she was readmitted with a recurrence at the site of the enterectomy. Applications of X-rays were given on several occasions without apparent benefit. The tumour got larger, and the patient died on April 10, 1915.

DESCRIPTION OF SPECIMENS (UNIVERSITY COLLEGE HOSPITAL MUSEUM, NOS. 421A AND 421B).

(*A*) *The Primary Growth* (*see* fig. 1).—A uterus, carcinomatous Fallopian tube and a tubo-ovarian cyst containing blood with strands of the carcinoma hanging into it, and a portion of the vermiform appendix with its fatty mesentery adherent to the upper part of the cyst. The uterus measures 12·5 cm. by 10 cm. by 7 cm. and is enlarged by an adenomyoma mainly of the left side, with a myoma 1 cm. in diameter in the posterior wall on the right side. The right retort-shaped Fallopian tube measures over its periphery 25 cm. in length; near the uterus it is thickened and slightly sinuous; after about 5 cm. it is enlarged to 1·5 cm. in diameter by distension with blood. Beyond 7·5 cm. from the uterus the ampullary portion is distended by solid yellowish-white growth measuring 12·5 cm. by 6 cm. by 6 cm., slightly hæmorrhagic and apparently degenerated towards the centre. At the widest part of the tube the wall is extremely thin (0·5 mm.); elsewhere it is 1 mm. thick. The free surface of the growth towards the uterus is smooth and lobulated, and in the lining of the free wall of the tube opposite this is a small pedunculated papillomatous growth. The fimbriæ, covered with adhesions which unite it to the ovarian cyst, are separated by dilatation of the ostium, allowing ragged portions of growth to hang into the cyst (tubo-ovarian), of which at one part of the interior the edge of a burst loculus can be seen and a few adherent fibrinous tags in places. The greater part of the cyst has been cut away; it was as big as an emu's egg and contained bloody fluid. To

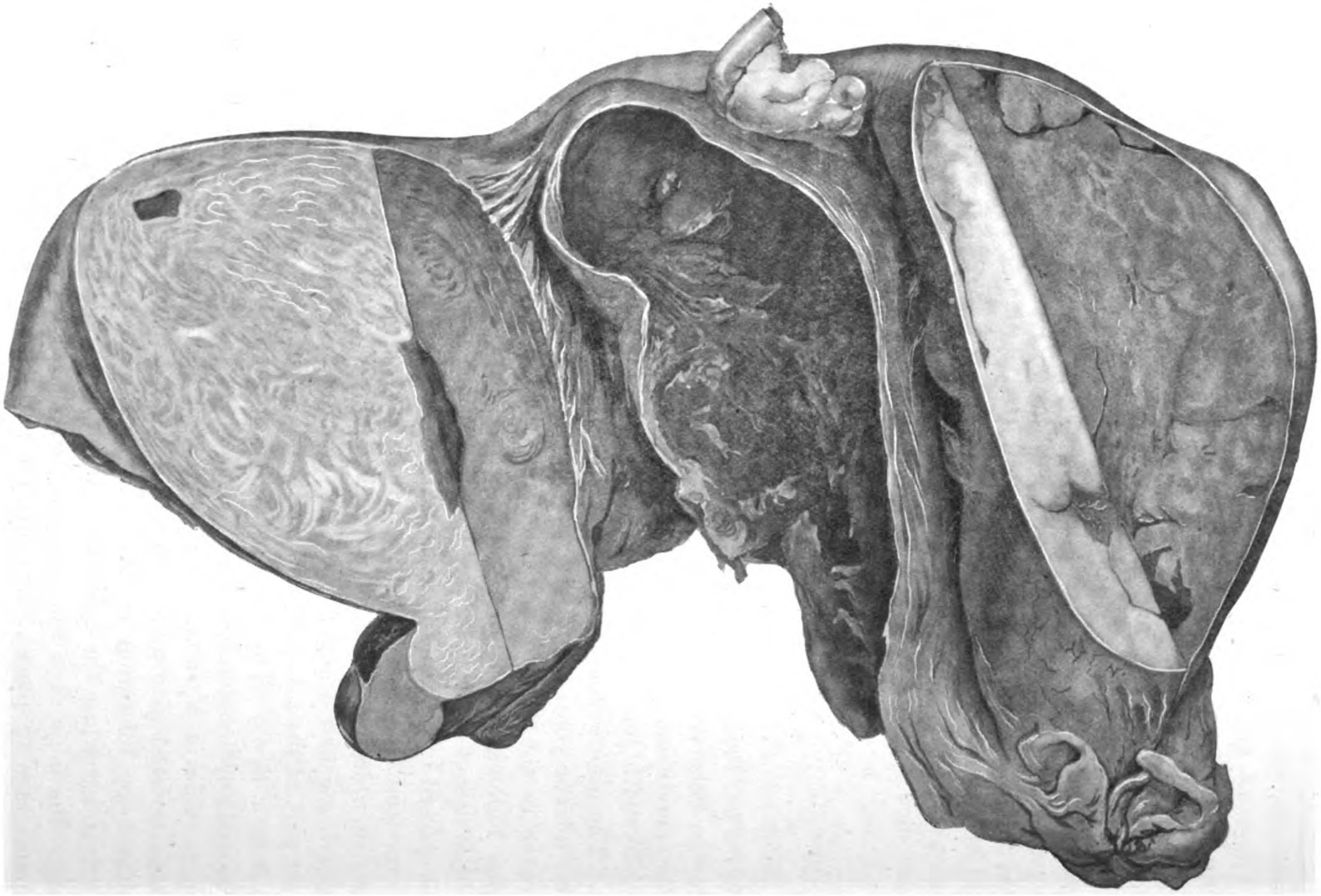


FIG. 1.—Specimen removed at operation, seen from behind. The uterus is enlarged by an adenomyoma affecting mainly the left wall; a small myoma is seen in right wall. Between the uterus and tube is part of an ovarian cyst into which the dilated end of the tube opens (not seen in drawing); above it is part of the vermiform appendix. The Fallopian tube is full of cancer, the free inner border of which is just visible in the upper part of the incision.

the top of the ovarian cyst adheres the outer half of the vermiform appendix with its mesentery containing lobules of fat. Numerous shaggy adhesions are seen on the surface of the specimen from which, however, a considerable part of the Fallopian tube is free.

(*B*) *The Secondary Growth* (*see* fig. 2).—Carcinoma of the pelvic colon secondary to the above. The carcinoma is seen adhering to and invading the muscular wall opposite to its mesentery. The growth measures 6 cm. by 5 cm. by 6 cm. It is free from adhesions, is smooth and lobulated and shows vessels on the surface. It deeply invades the muscular wall, but not the mucous membrane. A few cavities are seen in the centre. About 3 in. of intestine have been removed, the ends of which have shrunk in the spirit.

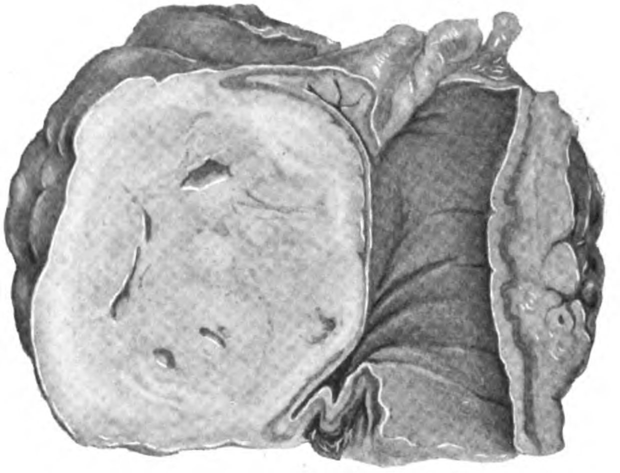


FIG. 2.

Specimen removed at secondary operation, showing tumour invading muscular wall of colon. The ends of gut have retracted during preparation.

MICROSCOPIC EXAMINATION.

(*a*) *Of the Isthmus of the Fallopian Tube, about* 2 *cm. from the Uterus* (*see* fig. 3).—The tube is thickened from hypertrophy and œdema of its wall, with some hyaline degeneration in places. The mucous membrane is papillomatous, the epithelium of the papillæ is arranged in a single layer. There is some round cell infiltration of the submucous layer, and also in places in the muscular wall. Deep in among the circular fibres of the wall are seen several cysts lined with a single layer of columnar epithelium. There is no clear evidence that these cysts have arisen from the epithelium of the mucous membrane, though that is probably their source, as is commonly the case in chronic interstitial isthmian salpingitis.

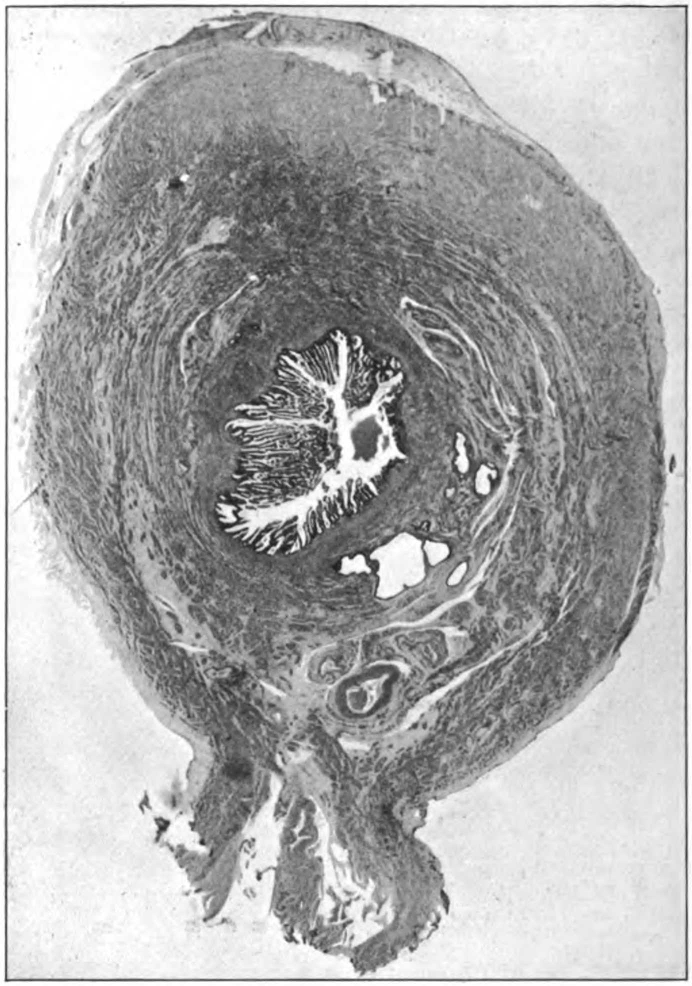


FIG. 3.

Transverse section of isthmus of tube, about 2 cm. from uterus. The muscular wall is hypertrophied, and its inner layer is invaded by a few tubules from the mucosa; some of these are dilated. The mucous membrane is papillomatous. (Photograph, $\frac{7}{1}$ natural size.)

(*b*) *Of the Fallopian Tube just Internal to the Free Inner Margin of the Main Tumour* (*see* fig. 4).—The tube is slightly distended with blood. Its wall is deeply invaded on the side towards the mesosalpinx with a cancerous glandular growth, which consists mainly of closely packed tubules lined with a single layer of columnar or cubical epithelium set in a scanty stroma, which is somewhat degenerated and in places vacuolated. Some of the gland spaces are dilated and have intracystic papillary growths. In a few places the epithelial cells are irregular and appear to be proliferated, forming masses several layers thick. There is some round cell infiltration of the stroma, especially at the deepest part of the growth.

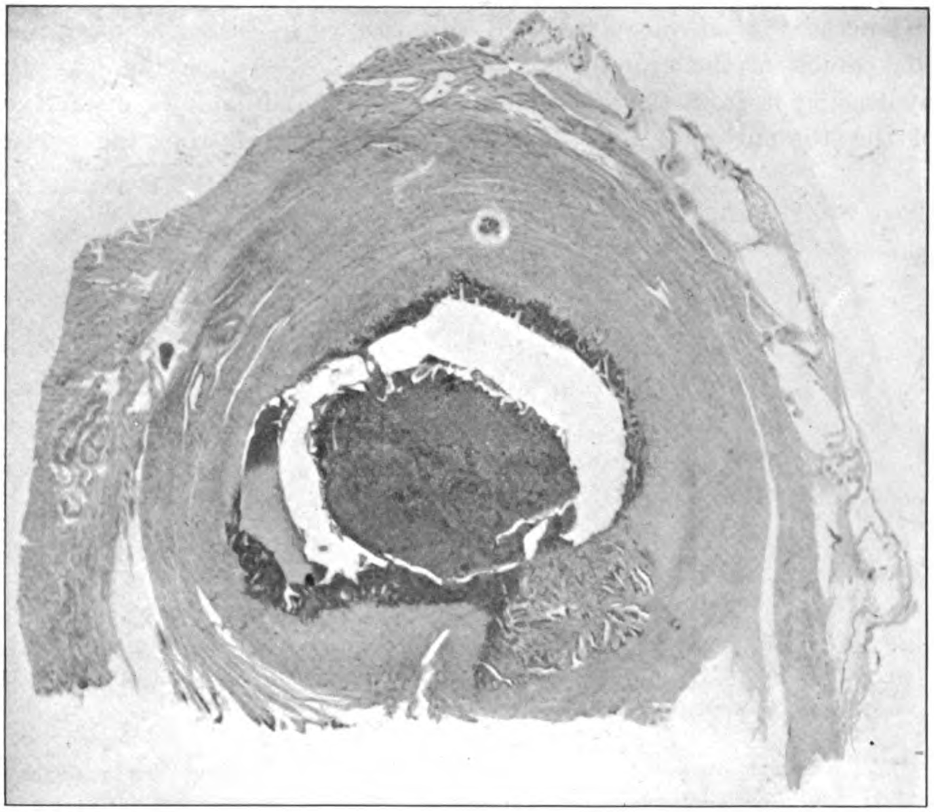


FIG. 4.

Transverse section of tube about 6 cm. from uterus, just internal to the main growth, showing muscular wall invaded with a mass of tubules at one spot. Adherent to this spot is a blood-clot in which papillæ and masses of proliferated epithelium are embedded ; this epithelium can be traced to the epithelium of the invading tubules. (Photograph, $\frac{7}{1}$ natural size.)

(*c*) *Of the Isolated Papilloma of the Lining of the Tube opposite the Free Inner End of the Main Growth.*—This is a papilloma covered with columnar epithelium in a single layer for the most part, but the terminal branches show a proliferation of the epithelium, which is in places two or three cells thick. It shows no tendency to infiltrate the wall.

(*d*) *Of the Main Growth* (*see* figs. 5, 6, 7).—The growth is a carcinoma made up of large masses of epithelial cells. The cells are degenerated, often vacuolated and accompanied by such a scanty stroma that much of the growth closely resembles a sarcoma (fig. 5). But by tracing it from the endosalpinx on the proximal and distal sides of the tumour one finds that the growth arises from the surface epithelium (fig. 7). In several places keratinization has occurred with well-developed cell-nests (figs. 5 and 6). In some places the appearance is that of an ordinary adeno-carcinoma with small masses of cells, with, in some places, keratinization (figs. 6 and 8); in others the cells are arranged in long straight parallel columns only one or two cells thick; this is well seen in the secondary growth (fig. 9). The same scanty stroma and resemblance to sarcoma were found in my third case.[1]

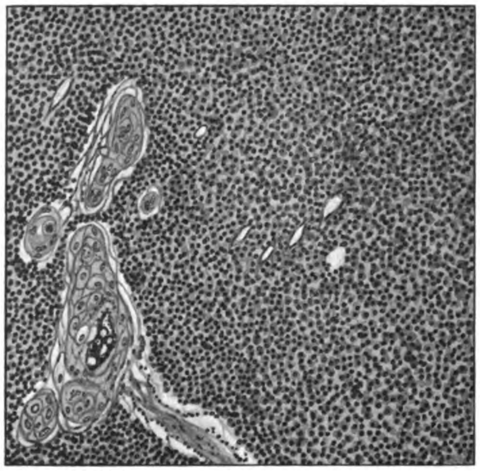


FIG. 5.

Part of sarcoma-like portion of the growth with keratinized cells resembling squamous cell-nests; large areas of the growth have the sarcoma-like appearance.

---

[1] Loc. cit., p. 33.

(*e*) *Of the Secondary Growth in the Bowel.*—The appearance under the microscope is like that of the primary growth, and likewise shows keratinization in many places.

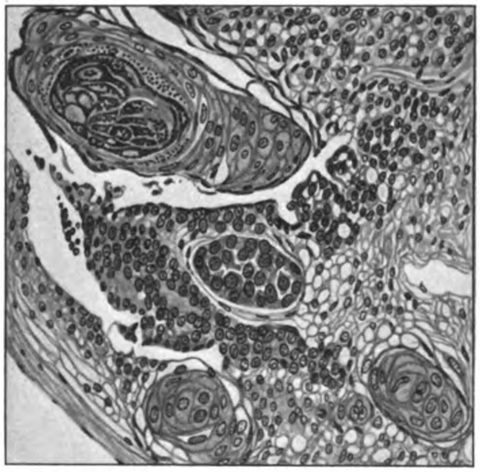


FIG. 6.

Part of carcinoma showing spheroidal cells, " squamous " cell-nests, and vacuolated degenerated stroma.

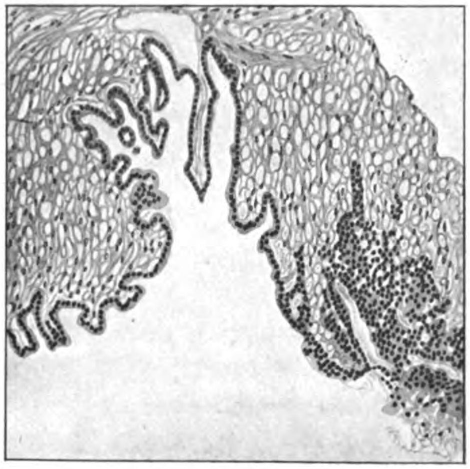


FIG. 7.

Section of lining of tube at outer edge of growth, showing the carcinoma beginning by proliferation and invasion of the surface epithelium.

(*f*) *Of the Large Uterine Growth.*—To the naked eye and under the microscope this is an ordinary adenomyoma. The small uterine growth has not been cut for the microscope, but is obviously a myoma.

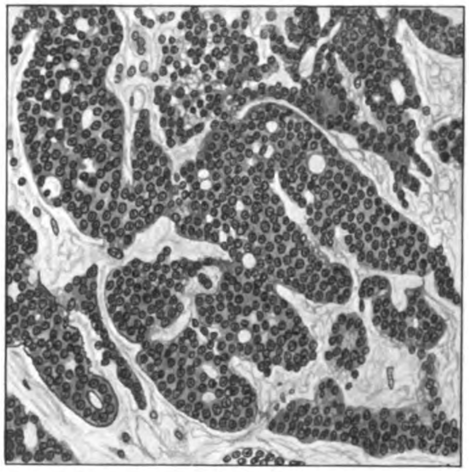


Fig. 8.

Section of part of the growth showing typical carcinoma.

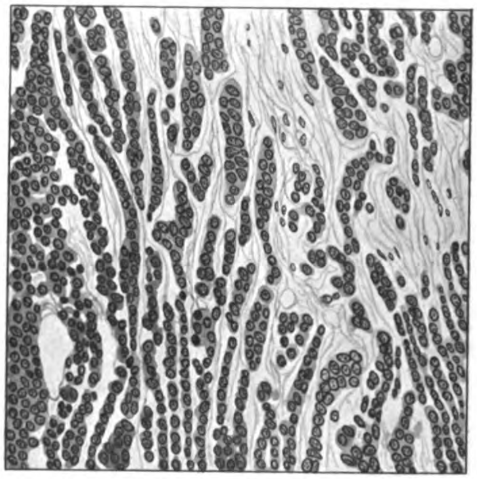


Fig. 9.

Portion of growth consisting of long, narrow, parallel columns of cells, with scanty stroma.

REMARKS.

The evidence that the case is one of primary cancer of the Fallopian tube is, I think, complete. The cells of the growth and stroma are somewhat degenerated and in places vacuolated; this and the small amount of stroma cause a close resemblance to sarcoma; but examination of the edge of the growth shows it to be an undoubted carcinoma of columnar cell origin. In view of the resemblance of this case and of my third case to sarcoma, I think all cases of supposed primary sarcoma[1] of the tube should be very carefully scrutinized, as they may prove to be carcinomatous. Perhaps the small amount of stroma may be due to the thinness of the wall of the ampulla, in which part the carcinoma usually occurs. The degeneration may be due to faulty preservation or to the preservative fluid (saline formalin followed by glycerine); the uterus and the papilloma of the tube, however, stain well, and I suggest that perhaps the degeneration may be due to the pressure to which a growth of this size may be subjected by the contractions of the tube.

The case affords some evidence of the mode of origin of primary cancer of the Fallopian tube. The isthmus of the tube is the seat of chronic salpingitis with invasion of the wall by a few glands; the mucosa is papillomatous; further out there is an isolated papilloma and, opposite to this, carcinomatous invasion of the wall by the epithelium of the villi, which proliferates and passes into the main carcinomatous growth.

The sequence of events would seem to be: salpingitis, development of papilloma, followed by invasion of the wall by the surface epithelium, which proliferates and forms the very cellular carcinomatous growth.

The association of primary carcinoma of the Fallopian tube with adenomyoma of the uterus is, I think, rare; its association with myoma is, of course, not very uncommon and occurred also in my second case —i.e., in half my cases. Mr. Doran gives the frequency in 100 cases at 9 per cent.

Lastly, I would again call attention to the fact that this case was for a time overlooked owing to insufficient examination; perhaps other cases have failed to be observed from the same cause. The case shows the advantage of keeping tumours in preservative fluid until they can be thoroughly examined, a practice which I advocated in my address to the Obstetrical Society in 1907 and venture again to advise.

---

[1] Many of the cases lend themselves to criticism—even von Franqué's is not convincing; his case is fully described (*Zeitschr. f. Geburts. u. Gyn.*, 1902, xlvii, p. 211) under the title of *Carcino-sarco-endothelioma*, and his paper is illustrated with beautiful drawings, which are depicted with an almost diagrammatic clearness rarely seen under the microscope.

DISCUSSION.

Dr. CUTHBERT LOCKYER: I note that Dr. Spencer admits the influence of chronic salpingitis in the causation of tubal cancer, and also that parts of his own sections demonstrating precancerous metaplasia show a structure very similar to portions of the complex growth exhibited by him (Dr. Spencer) in his epidiascopic demonstration.

Mr. ALBAN DORAN (communication by letter): I have read the records of later cases of cancer of the Fallopian tube with much interest and have come to the conclusion that primary cancer is the rule, a statement I should not have dared to make in 1888, when I described the first case under my personal observation. The malignancy of tubal cancer is of a very high degree, even after most modern and radical operations, yet after-histories rarely include any suggestion of a primary seat other than the tube. How comes it if, according to some authorities, tubal cancer is always secondary, that the primary disease happens to be always latent when a tube is amputated for carcinoma? Do we often meet with such a pathological phenomenon in the case of the breast or tongue? The Wells-Bickersteth case of papilloma teaches us that a new growth of a type which later experience has shown to be very liable to malignant degeneration may be absolutely confined to the Fallopian tube; when such degeneration occurs the tube must of necessity be the primary seat of carcinoma.

Dr. HEYWOOD SMITH: I should like to ask Dr. Spencer, with regard to the first case he narrated, whether, if the oviducts had been opened at once and had been found malignant, and if therefore the other one had been removed, in his opinion, it would have given the woman a better chance; or was it another case in which a woman had neglected to realize the importance of abnormal symptoms?

(*May* 4, 1916.)

Bilateral Papillary Growths of the Fallopian Tubes.

By H. R. ANDREWS, M.D.

R. L. WAS admitted to the London Hospital on March 15, 1916, aged 55; married twice, no children; menopause at the age of 49. In December, 1914, she began to have a discharge of blood, a little every day until the end of June, 1915, when the discharge "turned to pure water." She thinks that she has lost as much as a quart a day. This watery discharge has persisted ever since. On November 30, 1915, she was admitted into the London Hospital in my absence. The cervix was dilated, and a large mucous polypus was removed from the interior of the uterus. Since this there had been no bleeding, but the watery discharge had continued, and there had been intermittent pain. I suggested that carcinoma of a Fallopian tube was probably the cause of this profuse watery discharge. On examination, the uterus was found to be small. There was an indefinite soft swelling behind it; examination was not easy, but I thought that the diagnosis of tubal carcinoma was probably correct. I operated on March 17. There was a greatly dilated tube on each side, the left one being larger than the right, about 6 in. by 2½ in., while the right was about 4 in. by 2 in. There was no free fluid in the peritoneal cavity. The uterus was atrophic. Both tubes and ovaries and the whole of the uterus were removed. There were few adhesions, and the operation was easy. The patient made an uninterrupted recovery and left the hospital on the sixteenth day. The specimen (fig. 1) was hardened before being opened, so that the tubes should keep their shape. When the tubal swellings were squeezed clear fluid escaped through the cervical canal. A large dilated tube was seen on each side containing masses of papillary growth, which under the microscope was found to be papillary cubical-celled carcinoma. The growth in the right tube (fig. 2) was more solid and heaped together than that in the left. The endometrium showed nothing abnormal.

I thought that this specimen was worth showing to-night in connexion with Dr. Herbert Spencer's paper. I consider that the growth is a papillary carcinoma, but as I think that there may be some discussion

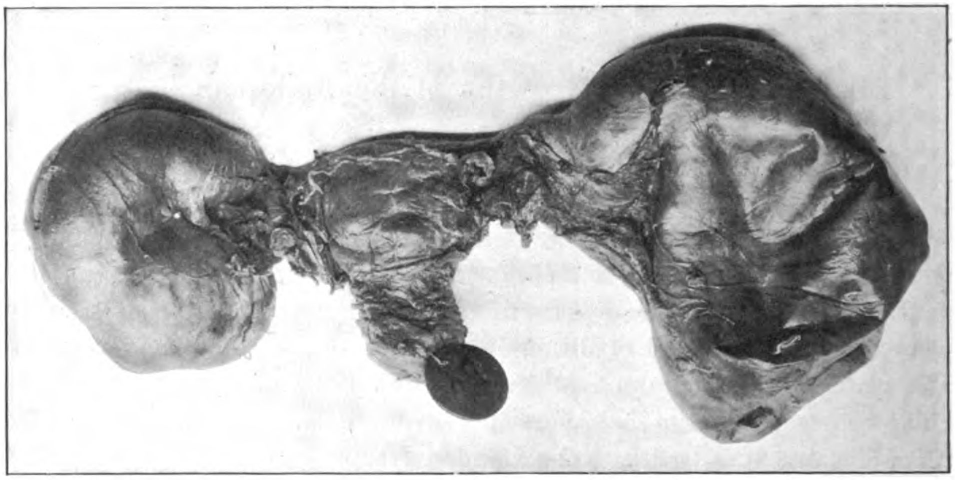


FIG. 1.

Dr. Andrews's specimen of bilateral papillary growths of the Fallopian tubes.

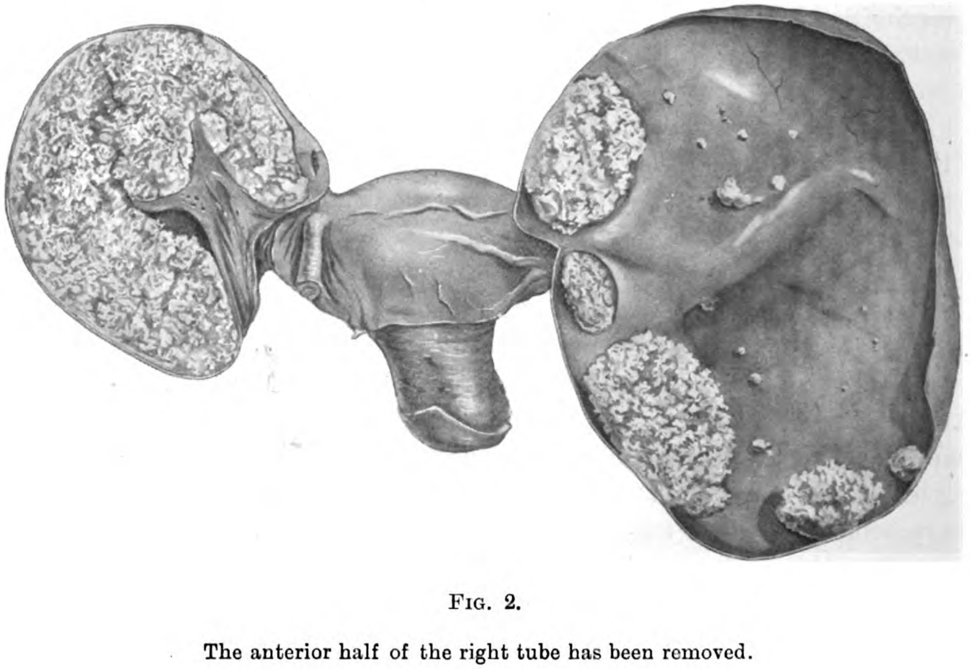


FIG. 2.

The anterior half of the right tube has been removed.

as to whether it should not be called a papilloma, I suggest that the specimen should be referred to the Pathology Committee.

Report of the Pathology Committee.—"We have examined Dr. Andrews's specimen of bilateral papillary growths of the Fallopian tubes and the sections thereof. We are of opinion that the naked-eye characters of the specimen show no gross infiltration of the wall of the tube, and no perforation of the wall anywhere. Microscopically, the growth consists of multiple papillary masses, in which there is active epithelial proliferation with numbers of cells showing mitosis. On this account we are of opinion that the growth must be looked upon as being at least potentially malignant."

(*May* 4, 1916.)

Case of Primary Epithelioma in Tuberculous Tubes.

By Lady BARRETT, M.D.

THE patient, C. P., aged 46, was admitted to the Royal Free Hospital on January 7, 1915 (sent by Dr. Rorke, of Leytonstone). She had been married nine years with no pregnancy. For ten years she had complained of pain in the right iliac fossa, which for six months had extended to the lower abdomen and back. During the last two months the pain had been considerably worse, radiating down both legs, and there was also frequency of micturition with pain at the end of the act. Menstruation had been perfectly normal in type (regular every twenty-eight days, lasting five days and painless) till twelve months ago. The last twelve months there had been pain during the last two days of menstruation.

On admission the abdomen showed a hard, well-defined tumour rising out of the pelvis to 2½ in. below the umbilicus and extending well into the right iliac fossa. There was tenderness over the tumour, especially in the right iliac fossa. It was dull upon percussion; there was no free fluid. On vaginal examination the cervix was found to be healthy and continuous with the central part of the tumour in front. A large mass filled Douglas's pouch and both fornices. Bimanual examination showed the tumour in the right fornix to be more elastic and more tender than the other parts of the swelling. Urine: 1015, acid, no albumin, sugar, pus or blood; urea, 1·8 per cent.

Operation: At the operation dense adhesions were found between the omentum and the peritoneum of the anterior wall and the bowel. After these had been separated a round bluish tumour, 6 in. in diameter, was seen rising out of the pelvis, also adherent to omentum and intestines. The appendages of the left side consisted of a large cystic portion adherent in Douglas's pouch and a more solid part, 4 in. by ¾ in., which joined the uterus. On the right side was a bluish-white cystic tumour the size of a goose's egg, with a soft solid portion, 3 in. by ½ in., beneath it, the whole filling the right fornix. The whole mass, uterus and diseased appendages were removed together.

The patient made a good recovery and was discharged from the hospital on January 29. For a few months she did well, but then gradually became invalided and died six months later from some lung affection. Unfortunately no post-mortem was obtained.

PATHOLOGICAL REPORT (KINDLY FURNISHED BY DR. HELEN CHAMBERS).

The specimen of uterus and adnexa now shown is from a case of old-standing tuberculous disease of the Fallopian tubes. The left tube, in addition to showing tuberculous disease, is extensively infiltrated with carcinoma. The case is of special interest because the growth has, in many places, a structure closely resembling a squamous-celled epithelioma, and it originates apparently as a primary growth of the Fallopian tube following metaplasia of the tubal epithelium, there being no evidence that it has spread from the uterus or that it is a secondary growth from some other source. Fig. 1 is a drawing of the specimen as seen from its anterior aspect.

The uterus, which has been removed by supravaginal hysterectomy, and has been opened along its anterior surface, is slightly enlarged. It is of normal shape except that there is a rounded swelling on the posterior wall, near the fundus, rather towards the left side, and due to an interstitial fibroid (3·5 cm. in diameter). This fibroid does not show in the drawing. The cavity of the uterus from the fundus to the internal os measures 4·5 cm., and the thickness of the wall near the fundus is 2·4 cm. The uterine wall and endometrium are apparently normal.

The right appendages: The right Fallopian tube is thickened and is adherent to the large cystic ovary; together they form a rounded mass (9 cm. by 6 cm., by 6 cm.), closely bound down to the side of the uterus. The anterior surface of this mass is congested and there are many tags of adhesion. In the posterior part there is a thin-walled transparent cyst, partly shown in fig. 1 at *A*. This drawing shows in section the tube surrounding the ovary. The tube has numerous caseous small tubercles along its whole length. At its abdominal end there is a caseous breaking-down area (*C*) 2 cm. in diameter. The lumen of the tube is occluded. In the ovary there is an old Graafian follicle cyst into which hæmorrhage has occurred. The posterior part of the ovary is transformed into a thin-walled transparent unilocular cyst; it is not infected with tuberculous disease.

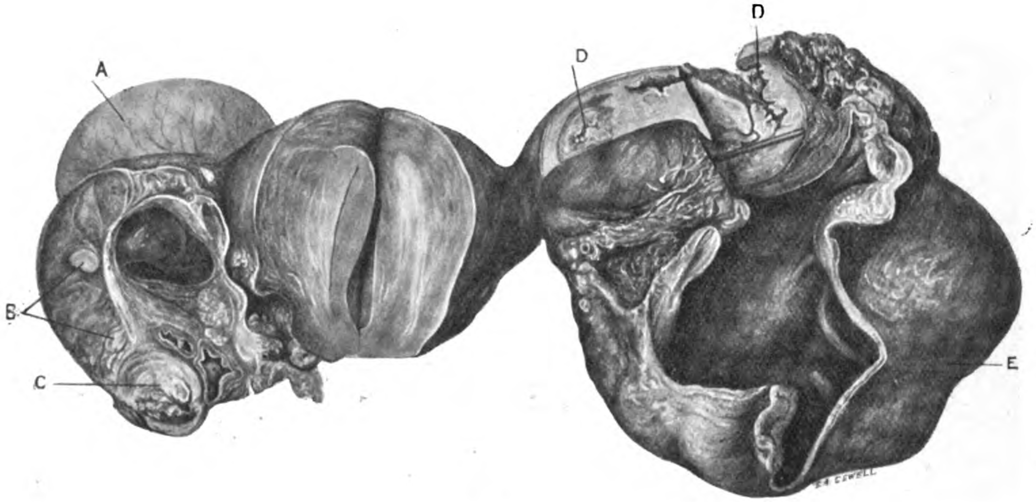


FIG. 1.

A, cystic ovary ; **B** and **C**, caseating tuberculous foci in the right Fallopian tube; **D**, carcinoma of the left Fallopian tube ; **E**, tuberculous tubo-ovarian cyst.

The left appendages: On the left side is a large cystic swelling adherent to the Fallopian tube, measuring approximately 10 cm. in diameter. This swelling is apparently the dilated outer end of the tube, for when opened it contains one large cavity which communicates with the lumen of the tube by an aperture 1·5 cm. by 5 cm. in length. There are several thick fibrous strands stretched across the cyst from this aperture. The cyst wall is everywhere approximately 0·2 cm. in thickness, its inner surface is mottled, patches of congestion alternating with pale areas. The Fallopian tube, which suddenly enlarges near its uterine attachment, is much thickened throughout its length, and forms a sausage-shaped swelling 8 cm. long and 3·5 cm. wide, adherent to the upper surface of the cyst. The wall of the tube, which is infiltrated by growth, varies in thickness from 0·5 cm. to 2·5 cm. The lumen is slightly dilated and the inner surface is rough, ragged and blood-stained. The peritoneal surface is not infiltrated with growth.

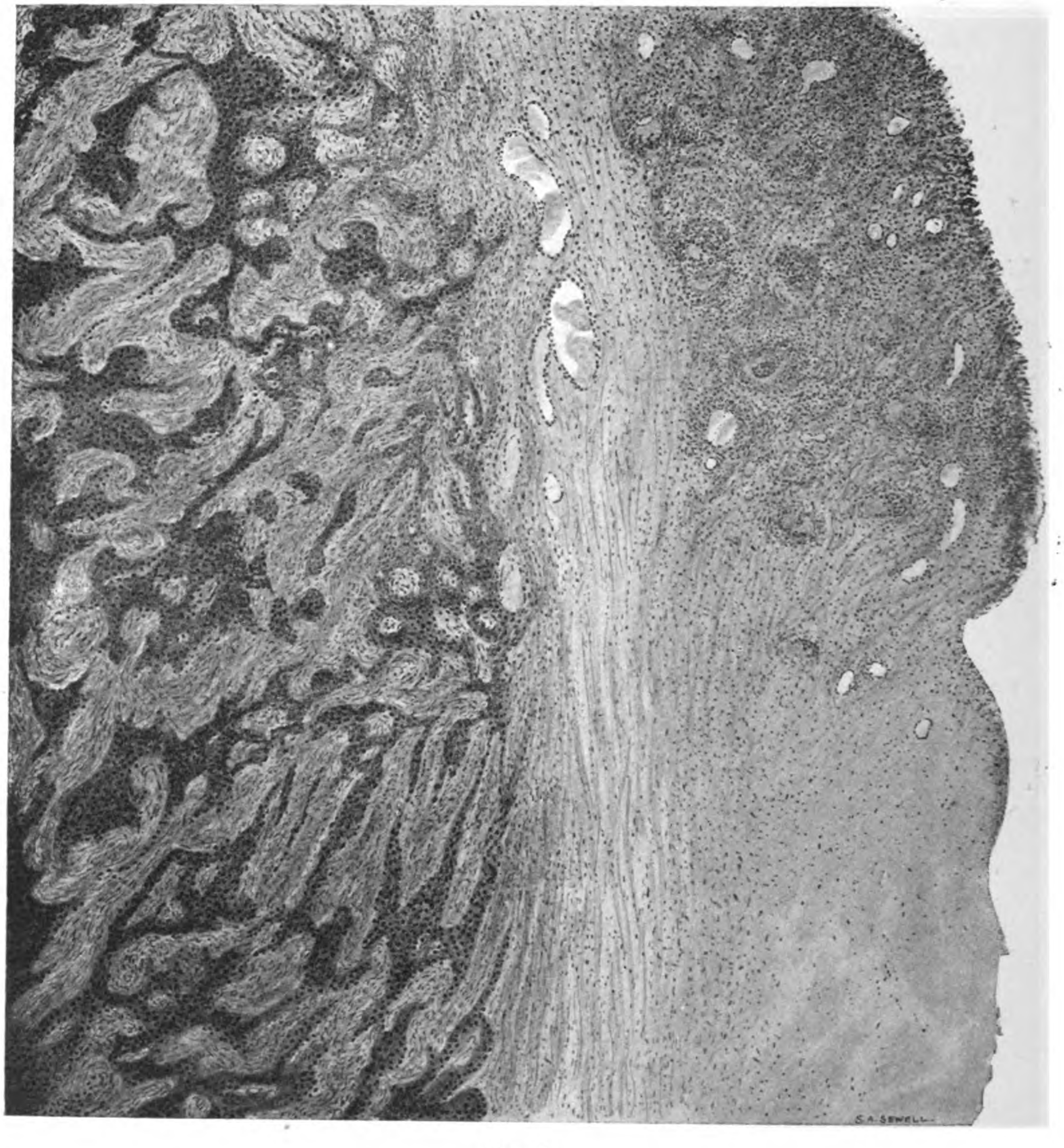


FIG. 2.

A drawing of a section through the left Fallopian tube and through the adjoining tubo-ovarian cyst. It shows the cyst wall lined with tuberculous granulation tissue containing numerous giant cells; the outer wall of the tube is extensively invaded with carcinoma.

Microscopic Examination.—Sections have been made from the uterus and both appendages from different places. The right tube shows very extensive tuberculous disease. There are numerous miliary and caseous tubercles along the whole length and also in the ovary. On the left side the cyst wall is lined with tuberculous granulation tissue, containing many large giant cells. Miliary tubercles can be found at various places along the left tube. The whole length of tube on this side is infiltrated with carcinoma. Towards the outer end the cells of the growth have keratinized and there are a few cell-nests. The growth in this situation has the typical appearance of a squamous-celled carcinoma. In other parts of the tube keratinization has not occurred, and the growth cells resemble the cells of the palisade layer of squamous epithelium. No growth can be detected in the uterus, in the right appendages, nor in the cyst on the left side. Numerous sections of the cyst wall have been cut to exclude the possibility of its being a dermoid. All these sections have a similar structure and show no lining epithelium. Sections from both adnexa contain tubercle bacilli.

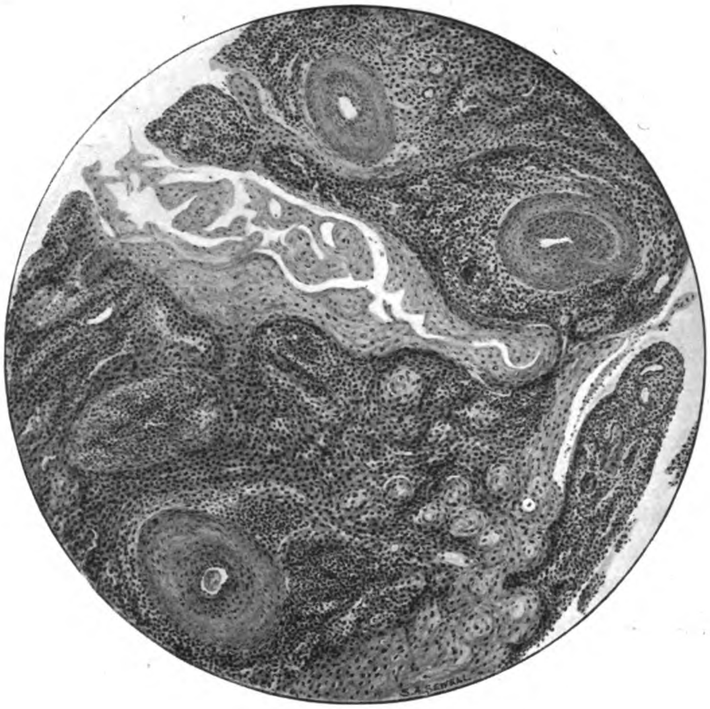


FIG. 3.

Report of the Pathology Committee.—"We have examined Lady Barrett's specimen and find that it shows the association of squamous- and polygonal-celled horny carcinoma with granulomatous and caseous tuberculosis."

Dr. CUTHBERT LOCKYER: I am interested in the association of tuberculous salpingitis, adenomyoma uteri and carcinoma of the tuberculous Fallopian tube. I have published a case of adenomyoma of the uterus with tuberculosis of the tubes, and several others are recorded in the literature. Von Franqué in 1911 and Lipschitz in 1914 recorded cases of cancer of the tube following on salpingitis of tuberculous origin. The marked metaplasia which has resulted in a typical squamous-celled growth in Lady Barrett's case is probably the result of the tuberculous nature of the primary lesion, since tubercle is well known to produce metaplasia of epithelial cells in a more marked degree than any other infective process.

(*May* 4, 1916.)

Pre-cancerous Changes seen in the Displaced Epithelium of Nodular Salpingitis.

By CUTHBERT LOCKYER, M.D.

I PURPOSE demonstrating, by means of the epidiascope and sections under the microscope, what I consider to be pre-cancerous changes in the epithelium which lined the follicles in a case of chronic "follicular" salpingitis. The patient from whom the tissues were obtained was a married woman, aged 39. She was twice pregnant, two children were born at term, the second confinement being sixteen and a half years ago. The patient was curetted in the country seven and a half months before admission into the Samaritan Hospital. She was admitted to hospital on account of menorrhagia and pelvic pain; she has been separated from her husband for many years.

On examination a fixed cystic swelling was felt in the left posterior quadrant of the pelvis; it was diagnosed as "parovarian." On opening the abdomen omentum was found to be adherent to the anterior parietes and the same tissue roofed in and covered the pelvic structures. The cystic swelling noted on examination was not in the left broad ligament, but proved to be a very adherent tubo-ovarian cyst (*see* fig. 1).

After its removal the back and fundus of the uterus (to which the cyst adhered) were covered with ragged adhesions, and as the appendages on the opposite (right) side were damaged by chronic inflammation, panhysterectomy and removal of the right appendages were performed forthwith. No lesion was discovered in the viscera lying within the abdomen. The abdominal wound was sewn up in layers.

Fig. 1 shows the left-sided tubo-ovarian cyst, from which the sections seen in figs. 2, 3 and 4 were taken.

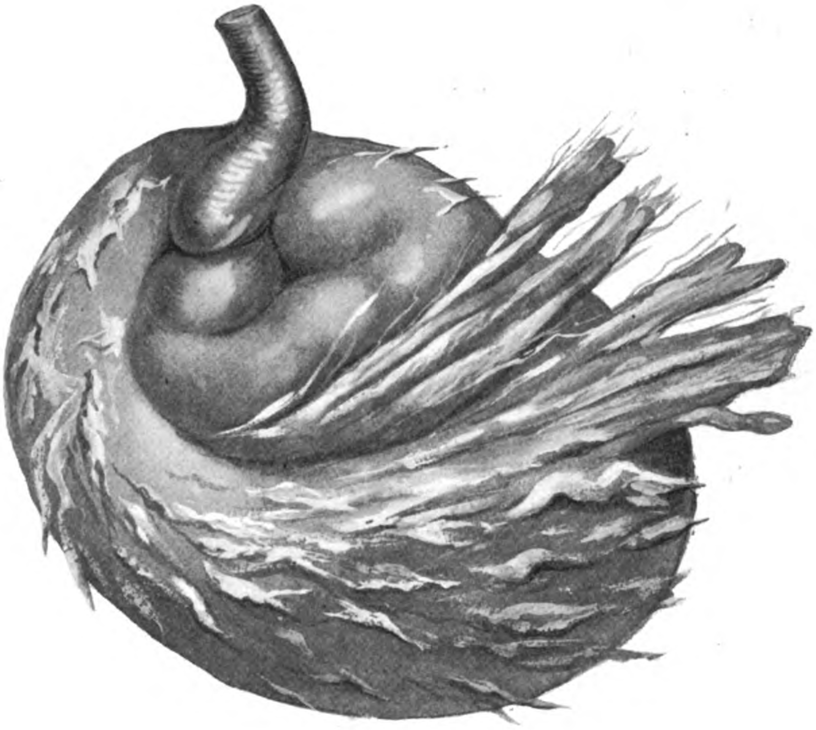


FIG. 1.

Tubo-ovarian cyst, with omentum adherent. (Left-sided.)

The uterus and right appendages are not illustrated. The right tube was enlarged and thickened, its distal end was adherent to the right ovary, which was cystic. No sections were made from this tube. Fig. 2 shows a section (× 6) taken through a "node" in the left tube. The fibro-muscular tissue is enormously thickened, and within it are many follicles formed from epithelium displaced from the lumen. The epithelium in these follicles is quite simple, it shows no signs of proliferation, the follicles being lined by a single layer of low cubical cells.

Fig. 3 shows a segment of the lumen of the tube (× 293); it was drawn from the section illustrated in fig. 2. The mucosa is seen to be infiltrated with an exudation composed of plasma-cells and lymphocytes.

Fig. 4 is drawn from a section taken through the isthmic portion of the same (left) tube. It shows an area in the muscle wall where several follicles have fused to form a large space, in which the lining epithelium appears to have run riot. There is active proliferation and metaplasia of the cells; this has led to the formation, in places, of an alveolar epithelial network, not unlike the cyto-trophoblast and plasmodi-trophoblast of a very early ovum. Portions of this epithelial network strongly resemble some of the masses of cells in the sections thrown upon the screen in the preceding demonstration of tubal cancer

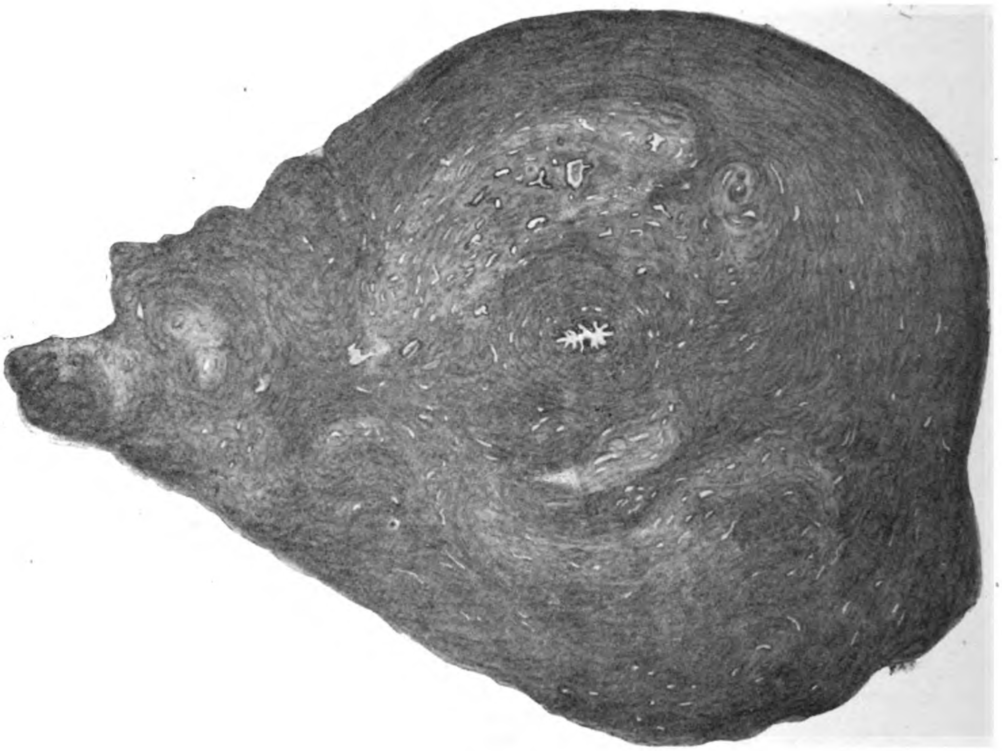


FIG. 2.

Nodular salpingitis, showing epithelial follicles in the muscle layers of the tube. (× 6.)

by Dr. Herbert Spencer (pp. 56, 57). The area comprised by this epithelial activity is surrounded by a zone of inflammatory cells as part of the infective process. This process is not tuberculous in character.

No tuberculous foci have been found in any of the sections (of which many have been prepared). In other sections of the left tube tiny papillomata have developed within the follicles formed by the displaced epithelium. I consider that such epithelial activity within the muscle strata of a tube, which is the seat of chronic salpingitis, is a clear demonstration of incipient malignancy, and my object in bringing these changes to the notice of the Section is to advance evidence in favour of the view that chronic salpingitis bears an ætiological relationship to cancer of the Fallopian tube. There is a difficulty in distinguishing between true carcinomatous change and the epithelial metaplasia seen in tuberculous salpingitis, a point to which von Franqué and Lipschitz have drawn attention. In my own case, however, the question of tuberculosis did not arise, and the causation of the salpingitis was no doubt gonorrhœa, as the husband of the patient was a dissolute individual, from whom his wife had to separate.

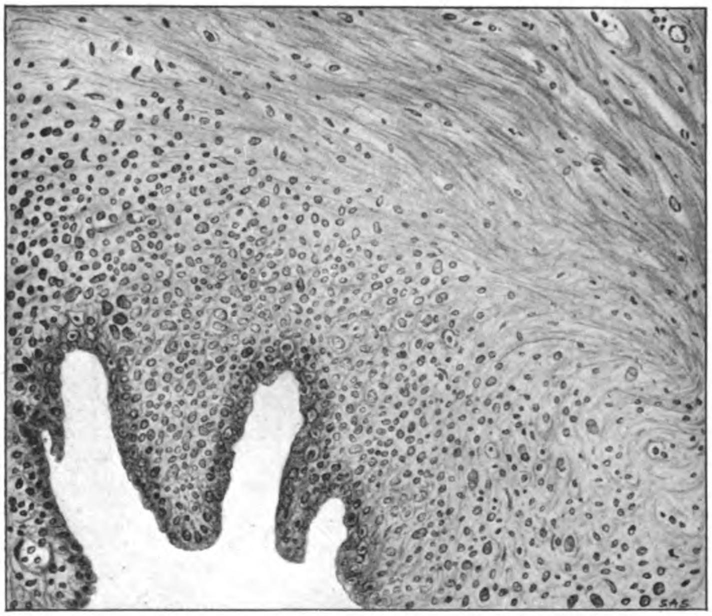


FIG. 3.

Segment of lumen of tube, showing plasma cells in inflammatory exudation. (× 293.)

The section shown in fig. 4 has been submitted to Mr. Shattock, who agrees that the condition may be rightly described as pre-cancerous, but that the tissues do not present the appearance of a *definite* carcinoma.

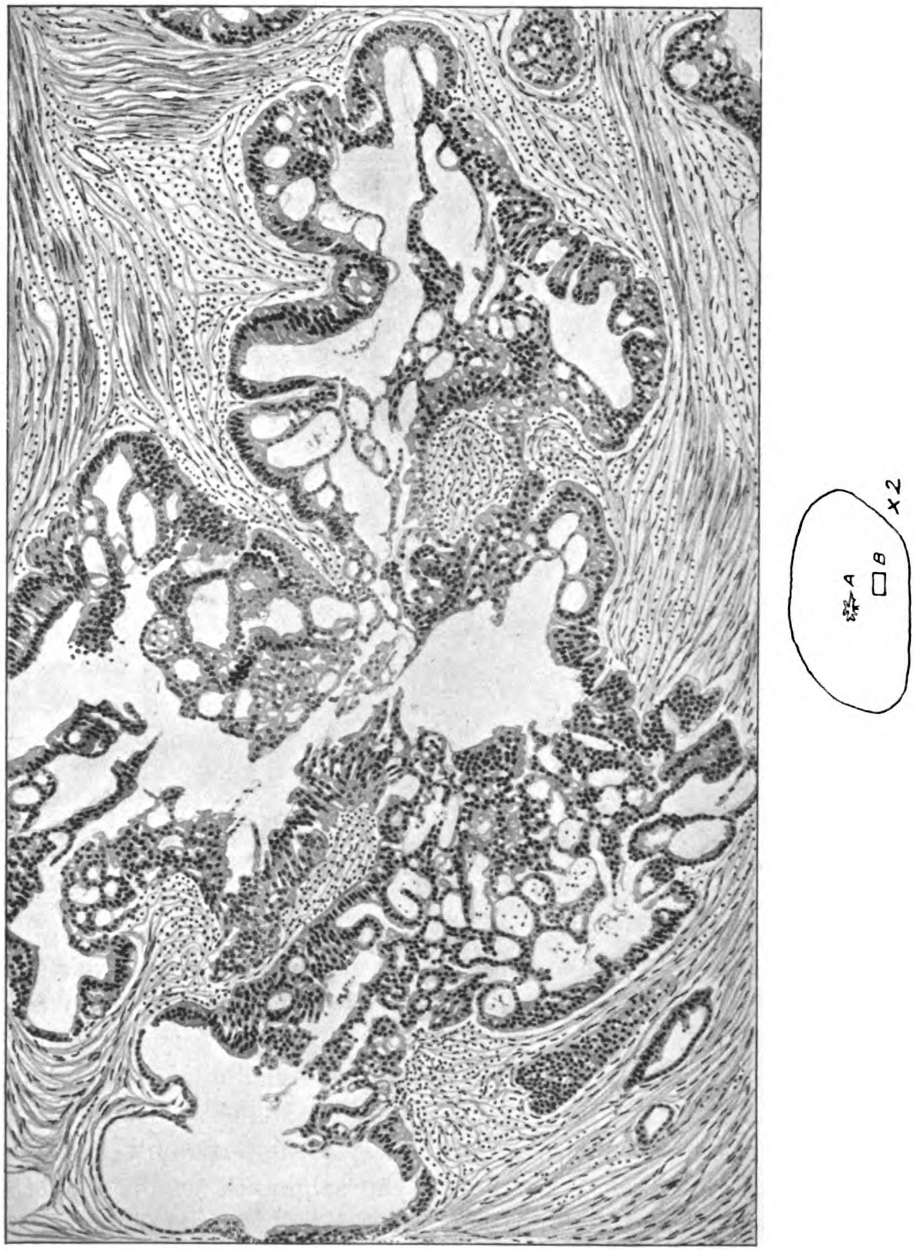


FIG. 4.

Displaced epithelium in chronic salpingitis, showing active proliferation and metaplasia of epithelial cells. (× 95.) Inset shows outline of section × 2. *A*, lumen of tube; *B* represents site of microscopic drawing.

(*May* 4, 1916.)

Unilateral Solid Primary Adenoma of the Ovary.

By HENRY BRIGGS, F.R.C.S.

THE recognition of a benign solid glandular growth—an adenoma—as a rare primary tumour of the ovary is the main purpose of this short communication.

In February, 1908, whilst Dr. T. E. Walker, as Fellow in Gynæcological Pathology, was at work in the Gynæcological Laboratory of the University of Liverpool, a "Clinical and Pathological Report on Forty-nine Solid Ovarian Tumours, of which Thirty-one were Fibromata,"[1] was jointly published by Dr. Walker and myself.

Amongst the more prevalent solid primary connective tissue growths of the ovary the numerical predominance of fibroma over sarcoma had been long and well established. Amongst the rare solid primary glandular growths any corresponding statement concerning adenoma and carcinoma was wanting. In the joint publication above referred to, four of these were described: one solid "unilateral" adeno-carcinoma, 6 in. by 4 in. by 3 in.; adhesions, ascites, peritoneal dissemination; death of the patient from cancer four months after the unilateral ovariotomy; and three, each of similar size to the above, also unilateral solid growths, with the naked-eye appearances of glandular tumours and not of fibromata. In 1908 the latter three growths were grouped under the heading of solid adenoma.

A recent review of the group with one addition (1913), completes the material on which this communication is based.

Only limited opportunities are possible with rare tumours, and ovarian adenomata, the rare solid as well as the common cystic, provide uncertainties; in two (Cases I and II) the alveoli were lined by short columnar or cubical cells in a single layer; in one (Case III) an intermediate arrangement—i.e., the alveoli were not packed, they were lined not with one but several layers of short cylindrical cells, curtailing and usually not obliterating the lumen of each alveolus—and in one of the growths (Case IV) the alveoli were fully packed with similar epithelial cells.

---

[1] *Journ. of Obst. and Gyn. Brit. Emp.*, 1908, xiii, pp. 77-95.

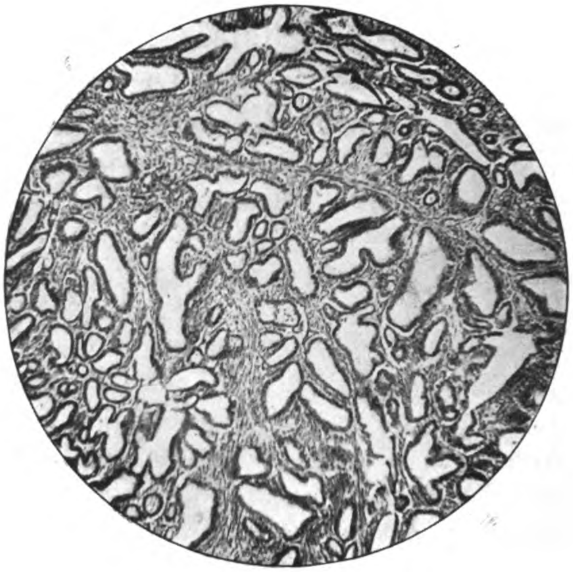


Fig. 1.

S. S., aged 54 (Case 1); adenoma. (× 40.)

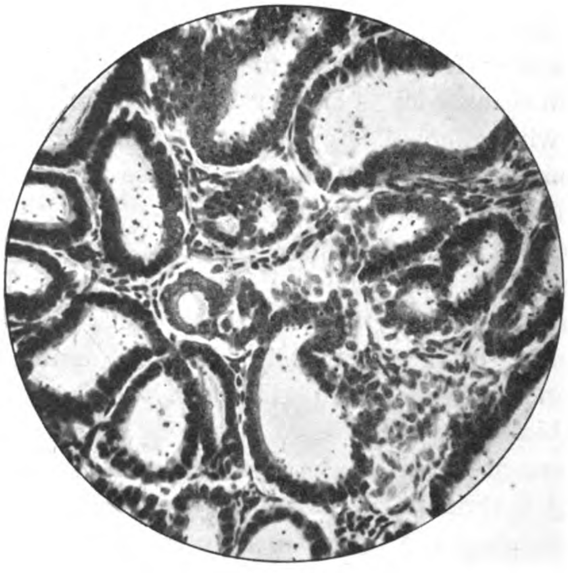


Fig. 2.

S. S., aged 54 (Case I); adenoma. (× 180.)

UNILATERAL LARGE SOLID ADENOMA OF THE OVARY. THREE CASES.

Case I.—S. S., aged 54, 8 in. by 4 in. by 4½ in., adhesions, ascites 1 gal.
Case II.—A. L., aged 38, 7 in. by 5 in. by 5½ in., no adhesions, no ascites.
Case III.—Mrs. McG., aged 62, 3½ in. by 3½ in. by 3½ in., no adhesions, no ascites.

Case I: Unilateral Solid Adenoma, 8 in. by 4 in. by 4½ in.; faint adhesions to Bowel; Ascites, 1 gal.—The growth, lobulated, hard: pale, dull red colour. Histological report: A single layer of columnar cells, slightly shorter and wider than those of the ordinary cyst adenoma. S. S., aged 54, the mother of eleven children, the youngest aged 16. Menses regular, but scanty during recent years. History of pain, ascribed to the tumour, first felt fourteen months ago. The tumour was hard and the size of a fœtal head, operation refused. Her abdomen afterwards rapidly increased in size from ascites. Ovariotomy, August 24, 1898: Tumour of the right ovary; the left ovary normal. After-history: Repeated strenuous efforts by Dr. Edis, myself, and others have failed to trace this patient.

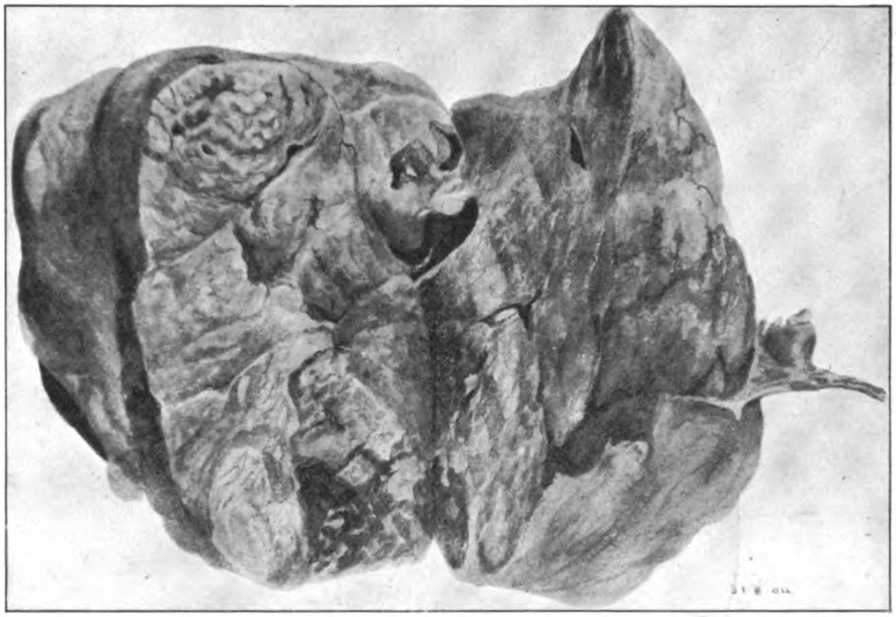


FIG. 3.

A. L., aged 38 (Case II); unilateral solid adenoma, 7 in. by 5 in. by 5½ in.; adhesions; no ascites.

Case II: Unilateral Solid Adenoma, 7 in. by 5 in. by 5½ in.; Adhesions; no Ascites.—The substance of the tumour was firm, not hard, the colour dull pink except in a one-tenth, necrotic portion which was pale olive green. The growth in the pelvis was universally adherent, in the abdomen only

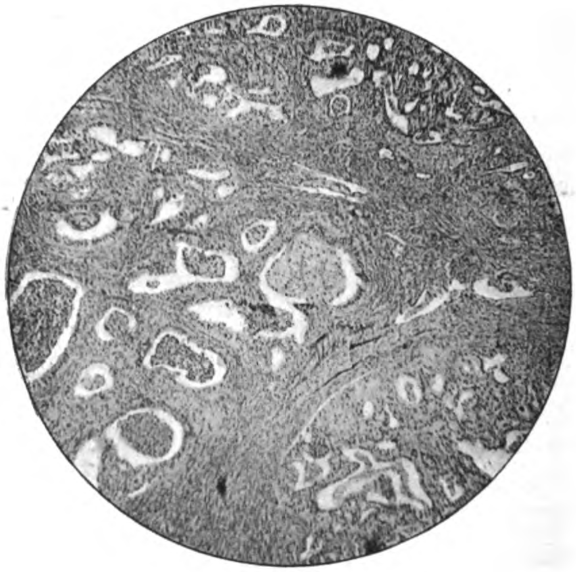


Fig. 4.

A. L., aged 38 (Case II); adenoma. (× 40.)

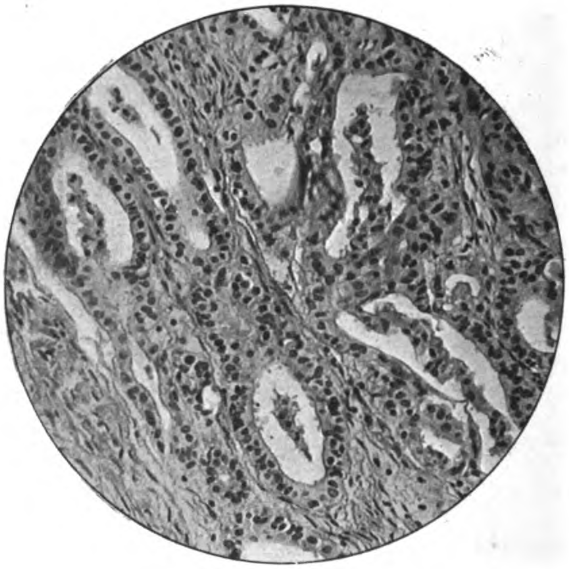


Fig. 5.

A. L., aged 38 (Case II); adenoma. (× 180.)

adherent to the omentum. Histological report: The walls of the alveoli are convoluted and lined by a single layer of short and wide columnar cells. A. L., aged 38, fourteen years married; two children, the younger aged 2½. Menses, formerly regular, 3-4/28 days, did not return after the second childbirth. History of two years' growth, rapid during the last six months; of menstrual suppression for two and half years; of loss of flesh for six months. Physical signs: A large, irregular, solid tumour reaching above the umbilicus and filling the pelvis behind the uterus. Temperature 100·4° F. to 99·6° F. on the four evenings in hospital before operation. Ovariotomy, August 31, 1904: Tumour of the left ovary; right ovary normal. After-history: Good health and no recurrence in 1907 after three years. Death in the Union Infirmary, Birkenhead, on January 7, 1910. Post-mortem examination by Dr. Ruth Western (now in India), then the Resident Medical Officer, who certified the death to be due to a benign tumour of the right ovary and exhaustion.

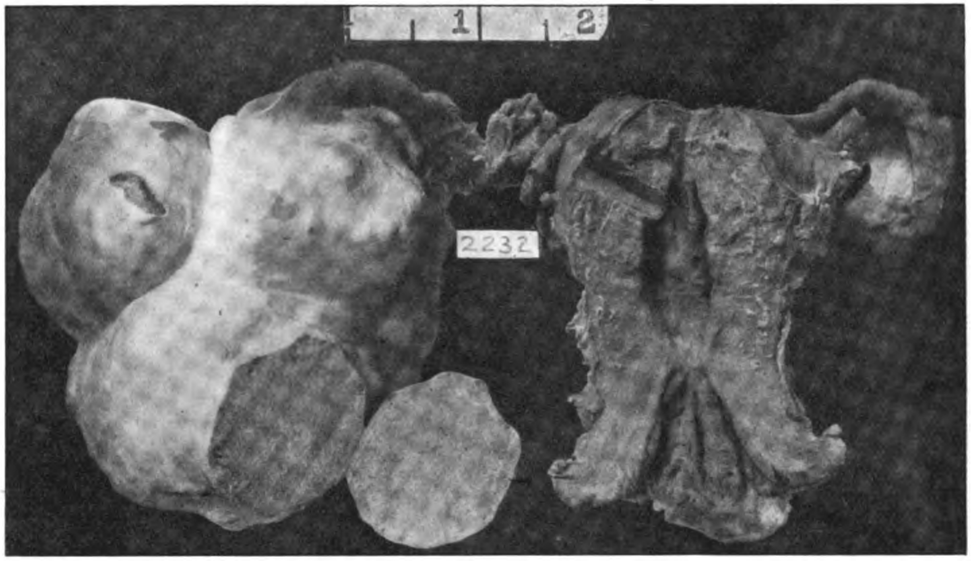


FIG. 6.

Mrs. McG. (Case III); solid adenoma, 3½ in. by 3½ in. by 3½ in.; no adhesions; no ascites. (Front view.)

Case III: Unilateral Solid Adenoma, 3½ in. by 3½ in. by 3½ in.; no Adhesions: no Ascites.—The growth is firm; pale in colour; appearance distinctly glandular, with a covering of ovary and one small cyst on the surface. Histological report: Glandular structure with cells not completely filling the alveoli; the cells are of varying shape, mostly degenerated and vacuolated; the basal cells are slightly shorter and wider than the average columnar cell. Mrs. McG., aged 62; seven children, the youngest aged 22;

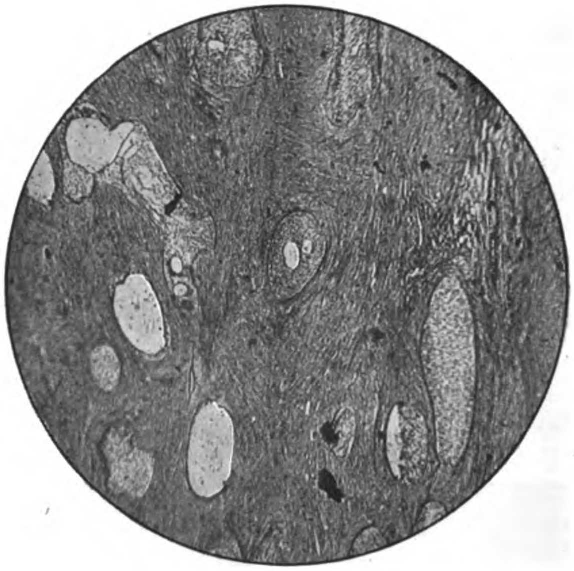


FIG. 7.

Mrs. McG. (Case III); adenoma. (× 40.)

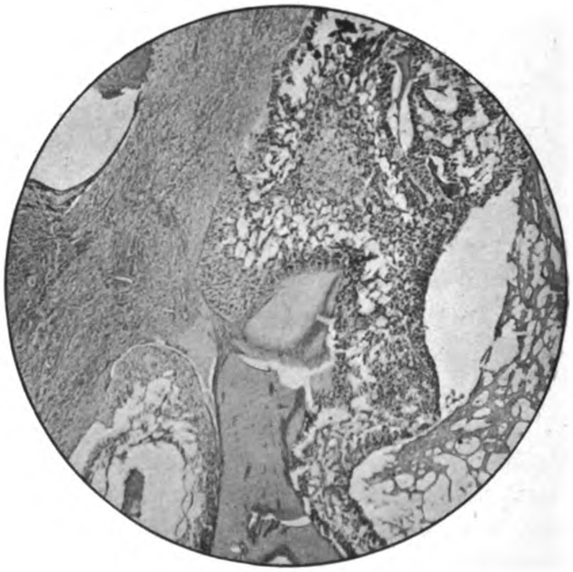


FIG. 8.

Mrs. McG. (Case III); adenoma. (× 90.)

twenty years a widow; climacteric at the age of 55. History of three months' uterine hæmorrhage; no pain. Physical signs: A right-sided solid tumour in the pelvis. The abdominal radical operation on May 23, 1913: A glandular tumour of the right ovary; left ovary normal; three small adenomatous polypi in the uterus. After-history: In good health on November 23, 1915.

On February 4, 1915, Dr. Herbert Spencer, before the Obstetrical and Gynæcological Section, reported on a ruptured unilateral solid cancer of the ovary; ovariotomy; subsequent pregnancies and good health after seven years. The report, in its general effect admirable and attractive, was to me especially welcome in view of the collection of four similar tumours in the Gynæcological Laboratory. Dr. Herbert Spencer's verdict, upheld by the Pathology Committee, if applied to the tumour in Case IV of my series, retransfers it to cancer, where, on histological evidence, I had myself placed it in 1900, transferred it to adenoma in 1908, and kept it there until in a renewed search for the remote after-history of the patient, on November 11, 1915, I first learned she had died of abdominal cancer as recently as July 20, 1915.

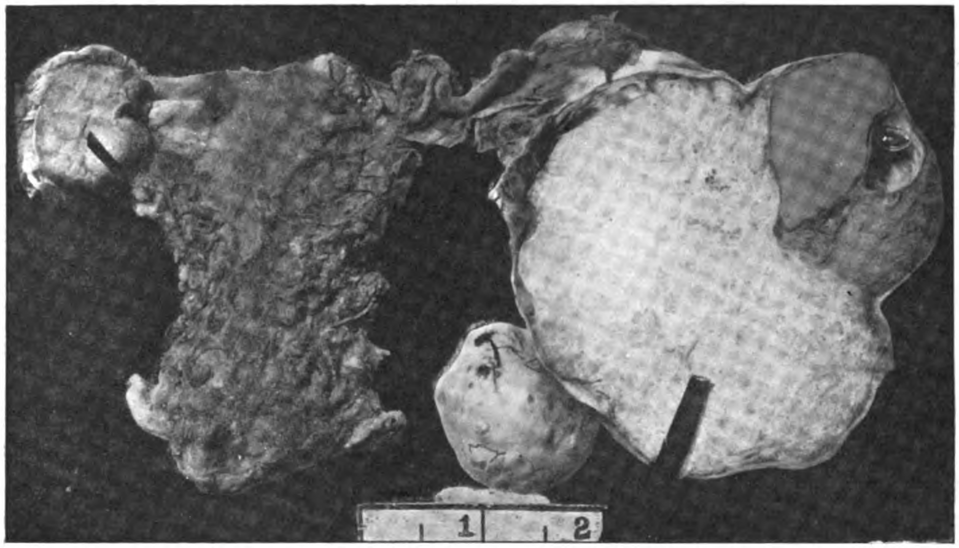


FIG. 9.

Mrs. McG. (Case III); unilateral solid adenoma, 3½ in. by 3½ in. by 3½ in.; no adhesions; no ascites. (Back view.)

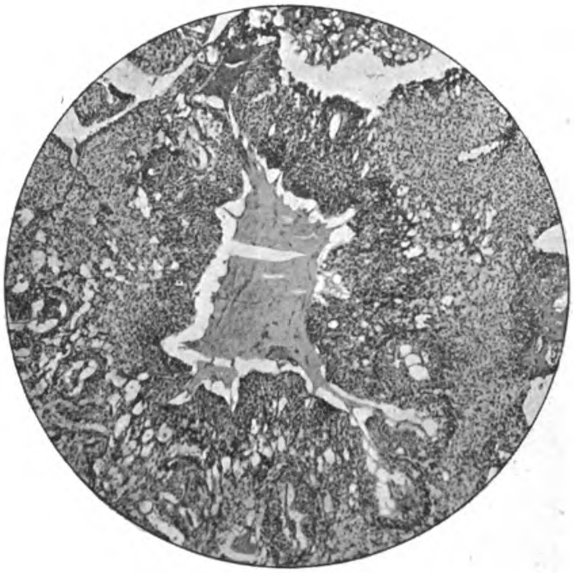


FIG. 10.

Mrs. McG. (Case III); adenoma. (× 90.)

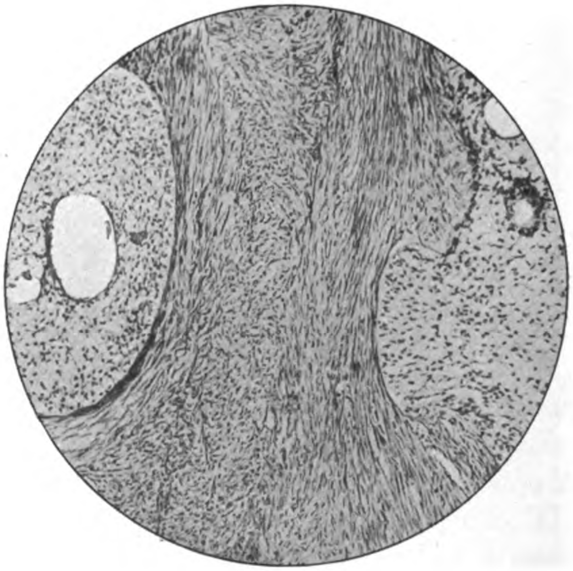


FIG. 11.

Mrs. McG. (Case III); adenoma. (× 180.)

I have received separate confirmation of the cancer verdict from my two colleagues, Professors Glynn and Beattie, who have generously and independently examined the preparations.

My own wavering attitude concerning this one tumour in the series may, or may not, have been warranted on either histological or clinical grounds; the tumour was large and universally adherent in 1900 before I removed it from amidst adhesions, which oozed so freely that I placed a gauze pack in the pelvis, and ten years later, in operating for the large incisional hernia, I deeply explored the abdomen and found no evidence of any new growth. Such an apparent surgical triumph over a large, adherent cancerous tumour is quite singular enough to suggest, if not to establish, the tumour's innocence and an entirely new and independent cancerous growth during the last five of the fifteen years of the patient's life subsequent to the ovariotomy.

Its inclusion in this communication is to be justified by its borderland or minor degree of malignancy, and by its advantageous association or contrast with the three cases of adenoma which have preceded it.

Case IV: Unilateral Solid Cancer of the Ovary, 10 *in. by* 7 *in. by* 6½ *in.*—Approximately twice the size of Dr. Herbert Spencer's tumour, to which there is a close resemblance in histological structure. The solid growth, partly firm, largely soft and necrotic, was universally adherent to the pelvic and abdominal parietes and to the bladder, omentum, and intestines. The left ovary, in which the growth was situate, supplied a thin external covering. The histological report: Scanty connective tissue, separating an abundance of alveoli of various sizes, packed with short cylindrical epithelial cells, the appearances indistinguishable from those of an adeno-carcinoma; recurrence was expected and looked for—it was not found until twelve and half years later (*see* the after-history of the patient). A. G., aged 36, seventeen years married; four children; a three months' abortion four years ago. History of three years' abdominal enlargement and of two years' intermittent metrostaxis. Physical signs of a large, solid, abdominal tumour. Ovariotomy, October 16, 1900: The ovarian pedicle was isolated, peeled off and tied before the tumour was removed; there was free oozing from the torn adhesions. The after-history covered fifteen years—the ovariotomy on October 16, 1900; no recurrence detected on examination in October, 1907; a large incisional hernia was radically cured by operation; the abdomen was then explored and pronounced to be free from recurrence of growth (January 7, 1910). Death occurred on July 20, 1915. Dr. John Hodgson, of Burnley, states that there was a cancerous growth, 4½ in. by 4½ in., under the gall-bladder, and he was first convinced of the return of the cancer two and half years before the death of the patient; he thinks the disease may have returned in the remaining ovary and that the above growth was secondary.

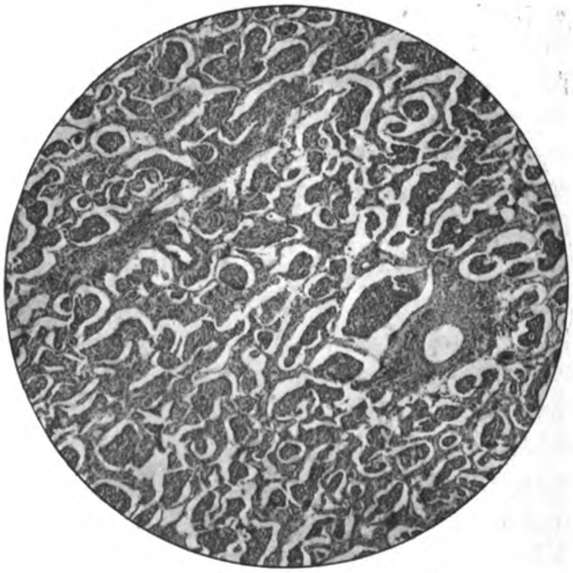


FIG. 12.

A. G., aged 36 (Case IV); cancer. (× 40.)

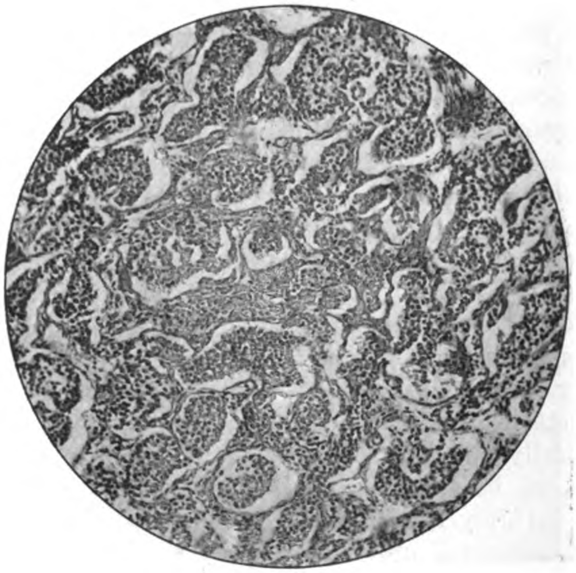
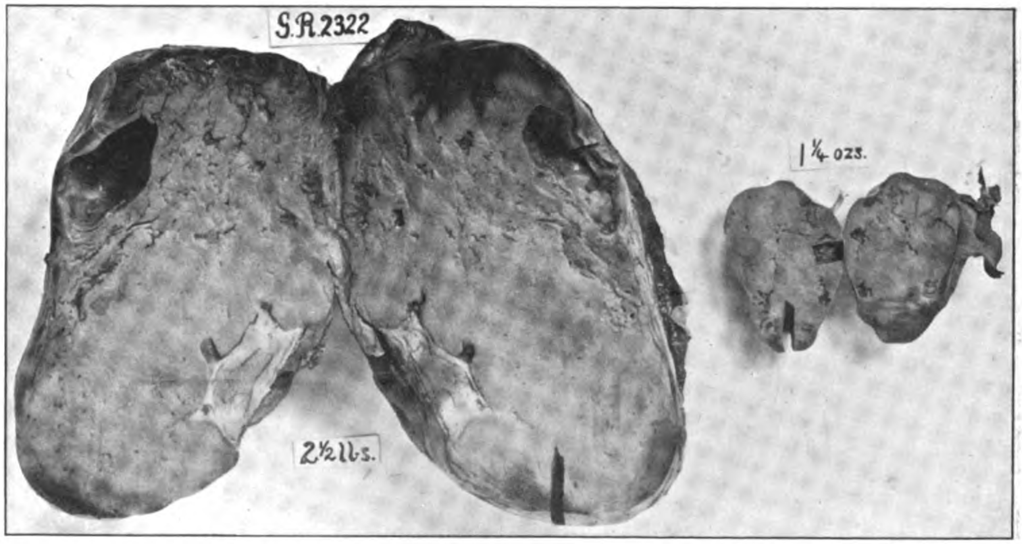


FIG. 13.

A. G., aged 36 (Case IV); cancer. (× 90.)

APPENDIX.

Illustrating cancer of ovary, bilateral, solid, and secondary to cancer of the stomach. C. C., aged 42; February 20, 1914.



Right ovary. FIG. 14. Left ovary.

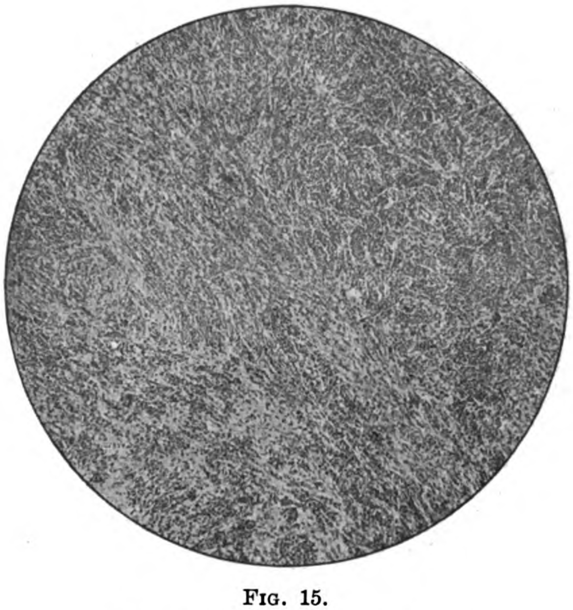


FIG. 15.

Secondary cancer of ovary. (× 40.)

For a pathological audit I am gratefully indebted to Professors Glynn and Beattie. For the help from the Museum I once more thank the Sub-Curator, Dr. R. A. Hendry, and for the preparation of the photographs my Laboratory Assistant, Mr. W. H. Jones.

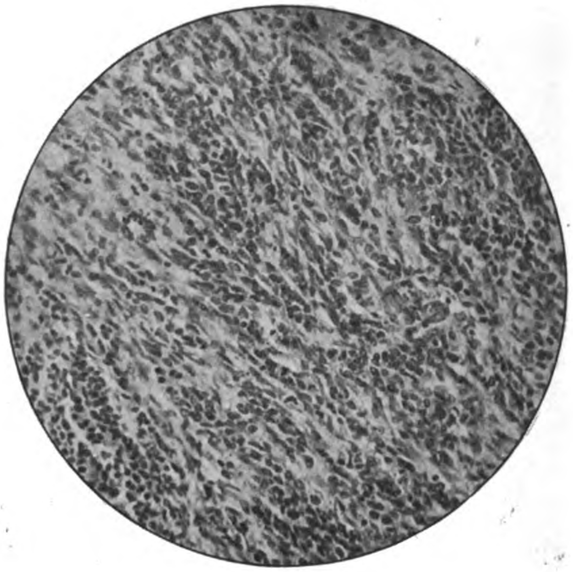


FIG. 16.

Secondary cancer of ovary. (× 180.)

Dr. HERBERT SPENCER : I think there is need for further careful study of solid ovarian growths with glandular contents. My own case, alluded to by Mr. Briggs, was certainly not an adenoma ; it was a soft growth and microscopically was a medullary carcinoma, exactly resembling one of Mr. Briggs's cases which recurred. Although over twelve years elapsed before the onset of recurrence in Mr. Briggs's case, that does not prove that it was not a true recurrence, which has been known to occur after more than twenty years in cancer of the uterus. In the light of Mr. Briggs's case my own patient, who has since had children and remained well for seven years, will be watched with some anxiety. The most interesting cases of solid "adenoma" are those hard tumours containing masses of epithelial cells diffused throughout the fibrous stroma, of which I have removed one example and several specimens have been exhibited before the Section. I have no doubt these hard, slow-growing tumours are simple fibro-adenomata, although the opinion that they are carcinomatous was expressed by several members of the Section when Dr. Giles's specimen was exhibited.

(*May* 4, 1916.)

A Second Case of Pneumo-peritoneum, probably induced by the *Bacillus aerogenes capsulatus* ; Release of the Gas ; Recovery.

By JOHN D. MALCOLM, F.R.C.S.Ed.

THE following case was not so fully investigated as it might have been, but the available facts are so unusual that it seems desirable to put them on record.

A woman, aged 38, the mother of two children, the youngest aged 3, enjoyed good health except that she was habitually constipated and had a chronic white vaginal discharge. At the beginning of October, 1915, she complained of pain, and a similar but more severe and prolonged attack began on November 1. A normal period commenced on its proper date on October 20. The patient was admitted to the Samaritan Free Hospital on November 4, and a well-defined tender mass was found on each side of the uterus. The temperature was normal.

The abdomen was opened on November 5. All the pelvic viscera were united by adhesions. Both Fallopian tubes were sealed at their distal ends and the outer two-thirds were considerably distended by muco-pus. The vermiform appendix was adherent behind the cæcum. The exposed peritoneum above the pelvis had a sodden appearance suggesting a mild peritonitis, but the coils of intestine were not adherent. The outer parts of both tubes, the left ovary, and the vermiform appendix were removed. These were not preserved.

The highest temperature and pulse-rate during the following week were respectively 99·8° F. and 100 per minute. No special notice was attracted by the case until the third day, when the abdomen became distended and hard. The size and hardness were lessened when the bowels acted, but on the seventh day distension was very great, the percussion note being hyper-resonant all over the abdomen. I did not sufficiently appreciate that the bowels continued to respond to purgatives, and a diagnosis of partial obstruction was made. Dr. Frances Mabel Huxley anæsthetized the patient, and with the assistance of the Matron the abdomen was re-opened on the seventh day after the first operation by an incision in the right groin with a view to draining the cæcum if it was distended. The tension was so great that the abdominal wall was practically bloodless, but as soon as the pressure was released it lost its anæmic condition.

There was a very small amount of fluid over the cæcum, just enough to make bubbles when the peritoneum was pricked, and at first I thought the bowel was opened. I therefore enlarged the peritoneal incision rapidly, and immediately the whole abdomen collapsed, the opportunity of collecting some of the gas which it contained being lost. There was no perceptible odour. The anterior abdominal wall was free from adhesions, but all the visible coils of intestine had become adherent to each other since the first operation. The intestines were not distended, and no fluid was seen. There was no wound of the bowel.

As a precaution against the development of intestinal distension, the cæcum was brought up to the incision, a Paul's tube was inserted, and the wound was closed. A rubber drain in the middle line did not seem to have any effect, good or bad. Only a little serum escaped from it. The cæcal fistula acted well, and there were no further abdominal symptoms. The lateral wound suppurated and there were symptoms of septic infective disturbance, until the Paul's tube separated and this wound became clean a fortnight later. Four weeks after the second operation the cæcum was closed and the abdominal wall repaired. Recovery was complicated by a short, sharp attack of bronchitis, but was otherwise satisfactory.

May 4, 1916: The patient wrote this morning that she has completely recovered.

This is the second case of pneumo-peritoneum in my practice. In the first the cancerous rectum of a woman, aged 60, was removed by the combined abdominal and pelvic method, the anus being left intact. A large pelvic abscess was drained nine days later. At the same time a quantity of odourless gas, which distended the peritoneal cavity like a balloon, was released. There was in this case no sign of peritonitis except the adhesions shutting in the pelvic abscess. The intestines were retracted and occupied a small space at the back of the abdomen. The patient is alive and well six years later.[1]

In both these cases although the abdominal wall seemed to have reached an extreme limit of distension, the bowels acted in response to purgatives and there was no vomiting. With so much distension within the intestine there is always vomiting, and after a time the bowels will not act. When distension is obviously due to an accumulation of gas, this difference seems to offer a definite basis for a differential diagnosis, but in both these cases I regret that I was taken by surprise when the gas was set free from the peritoneal cavity.

---

[1] *Proc. Roy. Soc. Med.*, 1915, viii (Surg. Sect.), pp. 13-24.

The gas was clearly not due to ordinary putrefaction, and it does not seem possible that it passed through any opening in the intestinal wall, because in both cases it accumulated for more than three days, and any opening so long existing would allow an escape of organisms which would bring about an inflammatory closure of the gap or a fatal peritonitis. Neither does it seem likely that gases can pass through the uninjured intestinal wall. In the discussion on my first case it was suggested that the gas might have been left in the peritoneal sac in closing the abdomen after the first operation, but this leaves the increase in its quantity unexplained. It is known, however, that certain micro-organisms have the power of inducing a formation of gas in the tissues, and arguing by a process of exclusion there seems no doubt that some such organism was the cause of the formation of gas in these cases, but in what conditions favouring the development of gases these patients differed from hundreds of others I am not able to say.

In describing my first case I endeavoured to some extent to summarize our knowledge of the organisms which produce gas in the tissues, and I will only state now that the *Bacillus aerogenes capsulatus*, which seems to me the most probable cause in the cases recorded, may exist in the body without inducing symptoms of any kind, until some part is damaged; but if the animal in whose blood this bacillus circulates is killed gases develop all over the body. In one case this was observed four hours before the patient died—a very unusual record. By far the most common manifestation of the presence of gas-producing bacilli is the emphysema found in septic wounds now so common in the practice of the Royal Army Medical Corps at the Front, a condition usually indicating great danger.

Very few cases have been published in which gases were found in the peritoneal cavity and in no other part of the body without a wound of the intestine or abdominal wall, and I have only discovered one such that did not prove fatal in addition to those related above. Dr. McCann will record another case to-night. Fatal cases in which the gas is confined to the peritoneal cavity are also rare.

It would appear that in all cases in which partial or total obstruction of the intestine is suspected after an abdominal operation, the possibility that there may be a pneumo-peritoneum should be considered. The results of attempts to relieve such symptoms of obstruction in these cases were so bad when opium was given in large quantities that often no attempt at surgical relief was made. For a considerable time I have in these cases simply opened and drained the cæcum or some coil of intestine as low in its course as possible. In 1914[1] I read before this Section the results of a number of these secondary operations with gratifying success. It was with a view to carrying out this treatment that I opened the abdomen in both the cases now recorded, and it seems to me possible that in some similar cases a pneumo-peritoneum may have been overlooked. Certainly in my two cases the degree of distension, if considered alone, would have made operative treatment seem hopeless.

Dr. McCANN: I have also met with an example of pneumo-peritoneum, and the facts of the case are briefly as follows: A woman, aged 63, was operated upon by me for double ovarian carcinoma, and at the operation numerous nodules were found distributed over the peritoneum. A quantity of serous fluid escaped, and as it was obviously useless to attempt any radical operation the abdominal wound was again closed. She made a smooth convalescence undisturbed by elevation of temperature or pulse-rate, and the abdominal wound healed soundly. Twelve days after the operation her abdomen began to distend and gradually increased in size, so that six days later she had to be propped up in a sitting posture. The abdomen was tympanitic all over, and was so tense that it caused much distress to her breathing. I made a small incision to the right of the abdominal scar, and as soon as the peritoneum was opened a quantity of *odourless* gas escaped, followed by sudden collapse of the abdominal walls, as if a balloon full of gas had been punctured. She was able to be discharged from the hospital eleven days later. Although there was slight distension with a tympanitic note, her general condition had much improved, and I understand no further inconvenience has resulted, although she will eventually succumb to the effects of the cancerous growths. The occurrence of air in the peritoneal cavity some days after operation, gradually increasing in quantity, suggests that it was the result of bacillary action, probably the *Bacillus aerogenes capsulatus* of Welch. On looking around for a possible explanation it occurred to me that the bacillus might have been introduced in the catgut used to sew up the peritoneum. Nothing was done except to incise the abdominal wall, and the only material left in the peritoneal cavity was the catgut in the abdominal wall. Further, the late occurrence of the accumulation of air after a smooth convalescence and primary union of the abdominal wall suggests that there was some bacillary action at work. This would appear to be a most convincing example of this rare condition, because there was no extensive traumatism or pus formation favouring the action of other organisms.

---

[1] *Proc. Roy. Soc. Med.*, 1914, viii (Obst. and Gyn. Sect.), pp. 16-24.

Obstetrical and Gynæcological Section.

President—Dr. M. HANDFIELD-JONES.

(*June* 8, 1916.)

Strangulation of a Myomatous Uterus by Torsion of the Body on the Cervix; Supra-cervical Hysterectomy; Recovery.

By JOHN D. MALCOLM, F.R.C.S.Ed.

ROTATION of the whole uterus with an ovarian or uterine tumour is not very uncommon, the displacement being at most something over half a revolution. I have never seen complete arrest of the blood supply from this cause, and I have not before seen or heard of a case like the following:—

On November 3, 1915, a rather frail lady, aged 70, married, but never pregnant, complained after dinner of pelvic pain. Next morning she was better and took her breakfast in bed as usual. She could not get up afterwards because the pain became so intense, and it was then accompanied by vomiting. Towards evening the temperature rose to 101° F. I saw her late that night with Dr. Hewetson and Dr. Watson, of Reigate, and found a hard, round, pelvic tumour, median in position and about 4 in. in diameter. Behind this and also in the middle line lay an elongated, irregularly oval mass, measuring apparently about 3½ in. from above downwards by 1½ in. from side to side. This was fairly soft but of uneven consistency. It seemed to be attached to the hard mass in front, and there was a soft, short cervix uteri below. The rectum was firmly compressed, but the abnormal parts seemed to be slightly movable as one mass in the pelvis. They were very tender, and therefore seemed larger and more fixed than they really were. It was known that a fibromyoma existed before the patient's menstruation ceased, and it was easy to surmise that something had become twisted, but the condition behind the hard tumour puzzled us all. On opening the abdomen a fibromyoma was seen attached to the left posterior upper part of the uterus. This and the uterine body had revolved one full turn on the cervix, the lower end of the body being so tightly twisted that the parts above were of a deep blue-black colour, and although it was only sixteen hours after the pain became severe and about twenty-eight hours from its first onset, the conditions caused a distinctly offensive odour. Supra-cervical hysterectomy was performed; the left ovary and Fallopian tube, which were raised by the new growth above the constriction, were taken away. The right ovary and the greater part of its tube were below the constriction and were not removed. Considerable trouble from flatulent distension followed the operation, but otherwise recovery was good although slow.

The specimen which is exhibited shows that the uterine body was as big as that of a woman in the prime of life, but it is obviously enlarged by congestion. The softness of its tissue due to senility evidently facilitated the attenuation necessary to make this viscus sufficiently narrow to become strangulated by torsion.

Dr. CUTHBERT LOCKYER: I welcome the publication of Mr. Malcolm's case of acute torsion of the uterine body because it demonstrates a rare condition and one which presents extreme difficulties in diagnosis. With reference to torsion of the corpus uteri generally considered, it is known that a twist of the body on the cervix through as much as 90° can occur without producing any symptoms suggesting its presence. In none of eight cases recorded by Kelly and Cullen did the torsion give rise to any special symptoms, and in one of these the uterine body, which was abundantly fed by omental blood-vessels, was rotated through 180°. The torsion usually occurs through the isthmus, which gradually undergoes atrophy and forms a sort of pedicle for the body above. This pedicle may ultimately be severed completely from the cervix below, as was shown in the case of Bastianelli, of Rome. An account of this case is published in Kelly and Cullen's work on "Myomata." The patient was aged 53, a fibroid had been known to exist for twenty years, and there had been several attacks of severe peritonitis. At the operation it was found that the myomatous uterus was completely severed from the cervix owing to atrophy of a torsioned isthmus. The uterus was not acutely strangulated as in Mr. Malcolm's case; on the contrary, it was adherent to the anterior abdominal wall, from whence, no doubt, it derived nutrition. The appendages were rolled up to form a single pedicle attached to the floor of the right iliac fossa. The pelvis was as empty as if supravaginal hysterectomy had been performed. Clinically, therefore, cases of *gradual* torsion are sharply differentiated from those of *acute* torsion. Mr. Malcolm's case well illustrates the latter condition, and, as supplementing the remarks of the exhibitor, I may refer to the following cases of acute torsion:—

(1) Poth's case, shown in Berlin, May, 1913. The patient was aged 56, she had suffered from severe abdominal pain for twenty-one years, and was

known to have a large abdominal tumour. The abdomen contained blood-stained fluid; a pedunculated subserous myoma with a twisted pedicle was removed and then the uterus itself was found to be twisted upon its neck through 360° from left to right.

(2) In August, 1914, Dr. Eden and myself operated on a case in which a similar condition was discovered. The large myomatous uterus was blue-black in colour, and both appendages, which had been rotated through 180°, were engorged with blood and thrombotic.

(3) Steinbüchel's case, in which severe internal hæmorrhage resulted from rupture of one of the vessels, which was severed during torsion of the pedicle.

(4) Grünerts's case, in which a moderate degree of torsion of the uterine body (90°) led to very acute symptoms simulating the acute torsion of an ovarian cyst.

(5) Jolly's case, in which a torsioned myomatous uterus became impacted in the pelvis and led to displacement and blocking of the ureters, double surgical kidney and death from uræmia.

The causation of torsion of the uterine body is a subject for speculation. When, as in Poth's case, the pedicle of a large myomatous uterus becomes twisted, it is not difficult to understand that a small uterine body lying below may share in the process, especially since it is acknowledged that once torsion has taken place it is apt to be progressive. In a case like Mr. Malcolm's, where the tumour has a wide attachment to the uterus, it must be assumed that in trying to rise out of the pelvis it meets with resistance, to overcome which rotation of the tumour and of the uterine body is brought into play. The fact that these cases occur in women over 50 years of age is noteworthy.

(*June* 8, 1916.)

Fibromyoma undergoing Cystic Degeneration growing from a Myomatous Pregnant Uterus.

By FREDERICK J. MCCANN, F.R.C.S.

AN anæmic, spare woman, aged 32, presented herself for examination at the Samaritan Free Hospital for Women on March 24, 1916. She had noticed an abdominal swelling for about three years, which, although more prominent at intervals, had appeared to remain about the same size. She had been married for five months. Her menstruation was of the regular twenty-eight day type, lasting four days with moderate loss, until January 21, when it ceased. Six weeks after the menstrual cessation she noticed a sudden increase in the abdominal swelling, which prompted her to seek advice at the hospital. She did not complain of any pain and her general nutrition had remained the same.

Examination: The breasts were not enlarged and did not exhibit any alteration.

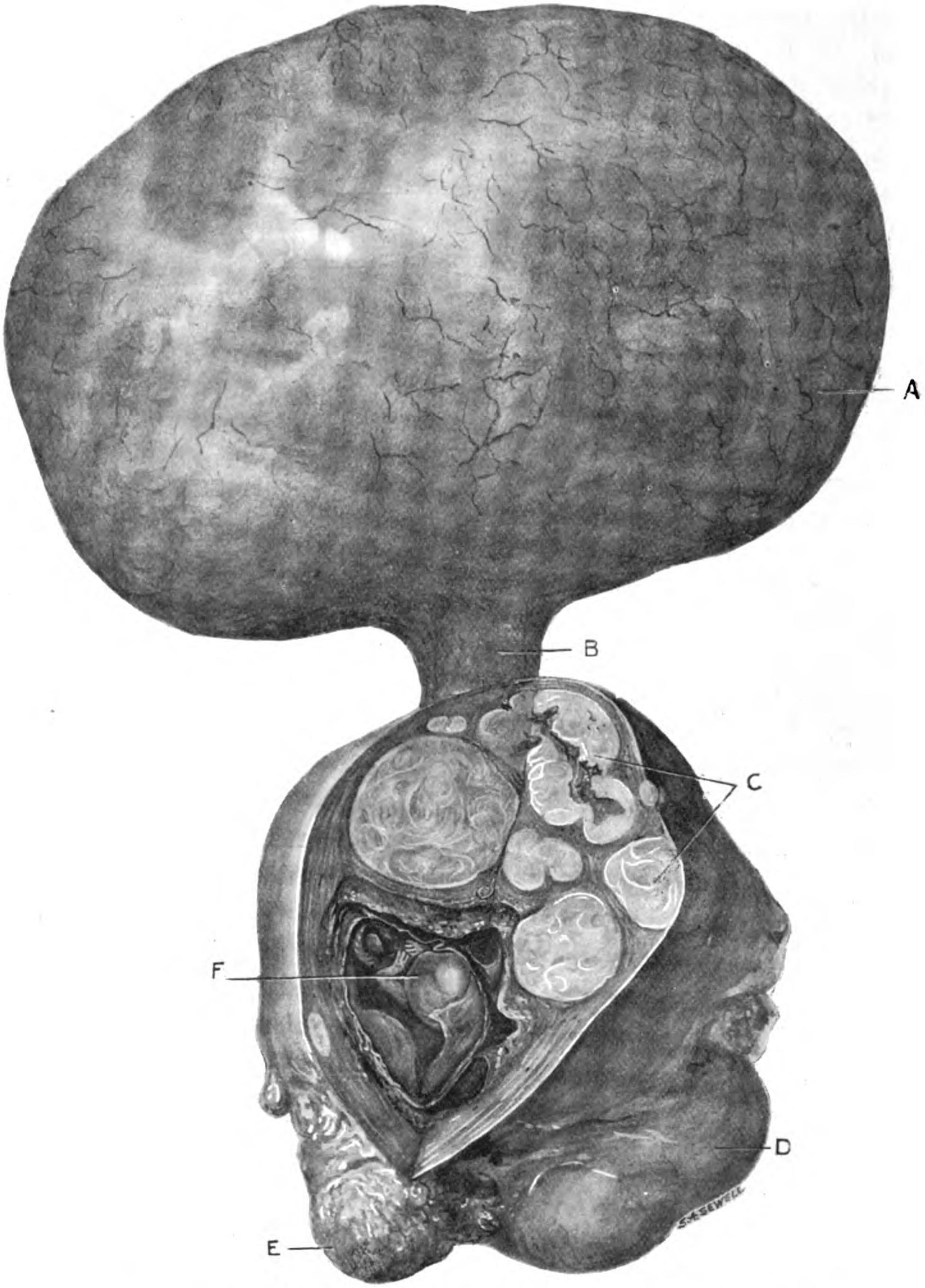
Abdominal examination: The abdomen was found to be occupied by a large rounded elastic tumour reaching nearly to the ensiform cartilage. It was movable and painless and appeared to be connected with an irregular swelling rising out of the pelvis. Bimanually the pelvic swelling was found to be an enlarged uterus, irregular in outline and softened in consistence. The cervix was also softened. A diagnosis of early pregnancy complicated by " fibroids " was made.

On March 28, 1916, the abdomen was opened in the middle line and a large rounded irregular tumour, springing by a short thick stalk from the fundus uteri, was exposed. The pedicle was clamped and divided and the tumour removed. Large vessels were noted coursing over the surface of the tumour. The enlarged uterus was then drawn up and found to be the seat of a large number of small fibroids scattered throughout its substance and bulging on the peritoneal aspect. The appearance presented by the white fibroid nodules embedded in the dark purple uterine tissue closely resembled what is seen in certain types of diffuse sarcomatous invasion of the uterine tissue. A larger fibroid nodule was growing downwards from its attachment to the lower part of the uterus on the left side. The uterus was removed and the appendages conserved as they exhibited no evidence of disease. She made a good recovery.

DESCRIPTION OF THE SPECIMEN.

The specimen consists of two parts: (1) The rounded tumour, which was attached to the uterus by a short thick pedicle 1½ in. by 1 in.; (2) the myomatous uterus containing a fœtus, placenta and membranes.

(1) The rounded solid tumour attached to the uterus measured transversely 6½ in., antero-posteriorly 5 in., and vertically 4½ in. when hardened. It is somewhat flattened from above downwards. Its external surface is irregular with vessels coursing over it, and here and there small cysts are observed. On section it is found to be composed of wavy bundles of fibrous tissue, studded with small cystic cavities containing gelatinous material. The blood-vessels are numerous at the peripheries. Microscopically the structure is that of a fibromyoma undergoing cystic degeneration.



Fibromyoma undergoing cystic degeneration growing from a myomatous pregnant uterus. **A**, fibromyoma; note the inequalities on the surface caused by small cysts and the vessels coursing over the surface; **B**, the short, thick pedicle; **C**, fibroid nodules embedded in the uterine substance, one of which exhibits cystic degeneration; **D**, fibroid outgrowth from the lower portion of the uterus; **E**, cervix uteri; **F**, fœtus of about two months' development.

(2) The uterus measures 5 in. from the os externum to the fundus, and 3¾ in. in its greatest transverse diameter. Numerous fibroid nodules of varying size are scattered throughout its substance and are well seen on section. There is also evidence of cystic degeneration in one portion of the section (*see* fig., p. 93). A larger fibroid outgrowth springs from the lower part of the uterus on the left side. The uterine cavity is occupied by a fœtus of about two months' development contained in an amniotic sac. The placental attachment appears to be situated at a lower level than usual, which might have been a predisposing cause to the occurrence of abortion.

Microscopical examination of sections from the uterine wall show that the nodules are fibromyomatous with commencing cystic dilatations.

REMARKS.

The operation was deliberately undertaken with the knowledge that the woman was pregnant, for it was felt that owing to the size and relations of the tumours the chances of a successful termination to her pregnancy were remote. It might be urged that the large tumour attached to the uterus should have been removed and the pregnancy permitted to continue. However, I decided against this alternative because of the extensive invasion of the uterus by fibroid nodules and the probability of an early miscarriage.

(*June* 8, 1916.)

Paravaginal Soft Fibroma.

By FREDERICK J. MCCANN, F.R.C.S.

I HAVE already brought before this Section two examples of paravaginal soft fibroma,[1] giving reasons for thinking that these tumours originate primarily in the pelvic connective tissue and are quite distinct from tumours of the vagina. I now bring forward a third example. The tumour was removed from a stout single woman, aged 40, who was brought to me complaining of increasing menstrual loss for four years. The interval between the periods was gradually diminishing, so that latterly it only amounted to three days. During this interval a greenish offensive discharge issued from the vagina. On going more minutely into the history it appeared that the blood lost was dark in colour and fœtid in odour. There was no other complaint except occasional constipation and some slight difficulty in micturition. Her general nutrition was good and had been well maintained.

---

[1] *Proc. Roy. Soc. Med.*, 1908, i (Obstet. Sect.), p. 321; and 1911-12, v, p. 38.

Examination: Abdominal examination did not reveal anything abnormal. Vaginal examination: On introducing the finger it was found that the vaginal canal was obstructed by a soft solid growth bulging the posterior vaginal wall forwards. The bulging was more marked towards the upper segment of the vagina, and in this situation a pool of fœtid dark fluid blood had been formed. The cervix uteri could not be reached and bimanual examination was unsatisfactory owing to the obesity of the patient. The vaginal wall was not involved in the growth. Rectal examination proved that the growth was in the recto-vaginal septum and that the rectal wall was free. It was not possible to reach the upper limit of the growth with the examining finger.

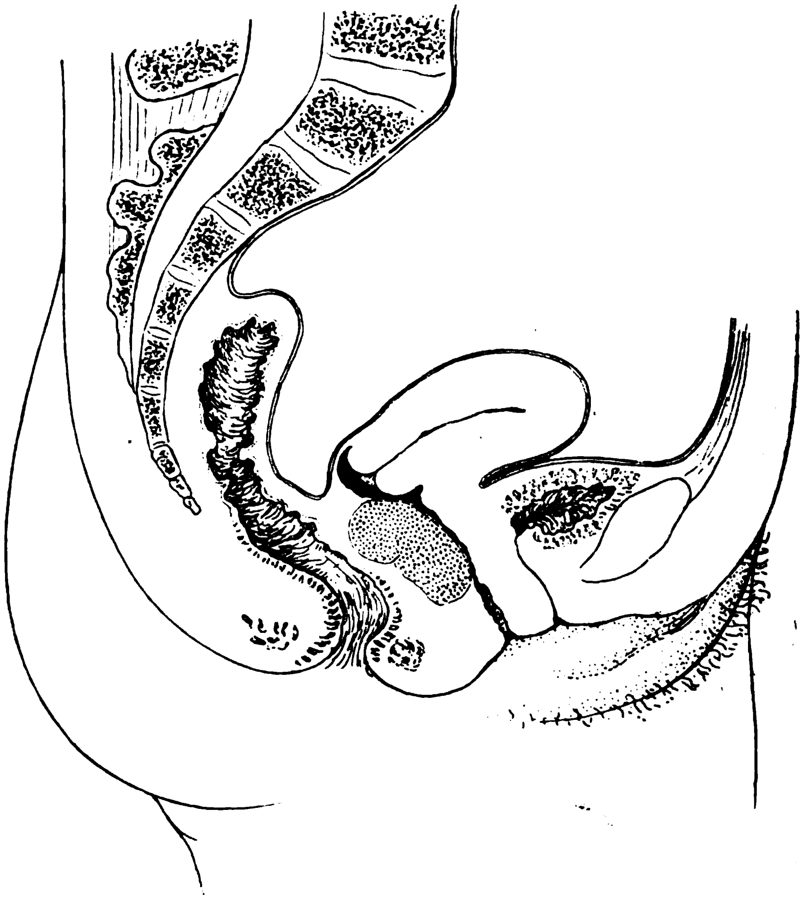
Operation: The posterior vaginal wall and perinæum were divided in the middle line and the tumour enucleated without much difficulty and with very little blood loss. The incisions in the vaginal wall and perinæum were sutured except at one spot, where a gauze drain was inserted. Buried catgut sutures were employed to obliterate the cavity left after removal of the tumour. The gauze was removed next day. The wound healed well.

DESCRIPTION OF SPECIMEN.

The tumour when removed was elongated, soft, and slightly lobulated, possessing a distinct capsule. It was markedly yellow in colour, suggesting the presence of fat. In the hardened state it measured 4¼ in. in length, 3 in. transversely and 1¾ in. in thickness. On section the surface was dense, smooth and glistening. Microscopically it exhibits the structure of a fibroma, with here and there aggregations of cells suggesting a transition towards a sarcoma. Sections stained with Sudan III show the presence of fat in some of the cells, but the amount is not abundant. The yellow colour of the tumour has completely disappeared since its preservation in formalin. Mr. Shattock, who has very kindly examined the specimen, is inclined to regard the growth as a fibrosarcoma on account of the cellular aggregations seen in the sections.

REMARKS.

The distinction between a fibroma and a fibrosarcoma is one of considerable difficulty and still furnishes a fruitful source of argument amongst pathologists. Even although the tumour recurs, it still does not prove its malign nature. Soft fibromata tend to invade surrounding tissues, thus rendering their complete extirpation a matter of some difficulty. In the present instance the tumour was encapsuled and was easily shelled out, but in the two other examples recorded by me



Paravaginal soft fibroma. Vertical median section of the pelvis showing the position of the tumour in the recto-vaginal septum. The vaginal canal was partially obstructed and a pool of retained menstrual fluid had formed above the upper pole of the tumour. The vaginal wall was not invaded by the growth, whilst the rectal wall was movable over it.

invasion of the bladder wall in one and the rectal wall in the other increased the difficulty of enucleation.

It is important, however, in attempting their removal, to get down at once to the level of these tumours, for they obtain a rich vascular supply from surrounding vessels, and if this vascular area be cut into free hæmorrhage will be the result. When the tumours are large it is better to control the main vascular supply before beginning any attempt at enucleation.

DISCUSSION.

Dr. RUSSELL ANDREWS: I have had a somewhat similar case which I described at a meeting of the Society several years ago. The patient complained of a bulging of the anterior vaginal wall which had been mistaken for a cystocele, and the operation of cystopexy had been performed by a general surgeon. There was a large semi-fluctuating mass presenting at the vulva I made a longitudinal incision through the vaginal mucous membrane and enucleated a soft œdematous fibroid about the size of a man's fist.

Dr. C. HUBERT ROBERTS: I have also met with a case very similar to that described by Dr. McCann, but (as in Dr. Russell Andrews's case) mine occurred in the *anterior* vaginal wall. It was really a fibrocellular tumour of the utero-vaginal cellular space and not a vaginal fibroid. The patient was aged 47, single, and was admitted to the Hostel of St. Luke, Fitzroy Square, W., on November 12, 1912, under the care of Sir Francis Champneys, who removed the tumour. I was then the visiting medical officer. The patient's chief complaint was trouble with micturition for the previous twelve months, with occasional attacks of retention of urine. On examination, a smooth mass was found bulging the anterior vaginal wall as high as the fornix, convex in shape and almost occluding the passage mechanically. The cervix could just be felt far up behind this mass. A "cake-like" mass measuring 4 in. by 4 in. and 2 in. vertically could be grasped bimanually. It was firm but not elastic. A bladder sound passed 6 in. in front of the mass. It was removed under anæsthesia by incising the anterior vaginal wall and was found to be quite free of the urethra and to occupy the cellular space between the bladder and cervix. It was fairly easily enucleated from its cellular bed and had the appearance of a soft fibroid. It weighed 7 oz. The cavity was plugged with gauze as bleeding was fairly free. The patient did well and has never had any recurrence to date. Sections of the tumour showed it to consist mostly of fibrous tissue and not muscle (van Gieson stain). Very few cellular elements were found. It appeared to be an innocent growth and not a sarcoma.

(*June* 8, 1916.)

Three Cases of Hæmatoma of the Abdominal Wall.

By HENRY RUSSELL ANDREWS, M.D.

Case I.—A patient, aged 39, was admitted into the London Hospital on February 15, 1916. She had had no previous illness except acute rheumatism at the age of 16, and had had good health up to Christmas, 1915, when she developed a bad cough, which became so troublesome that she could not get about the house and could not lie down, having to be propped up in bed. Six or seven weeks before admission she noticed that she had swollen feet and hands. Two or three days before admission she felt a severe pain in the right side of the abdomen, which was continuous and had increased in severity. She first noticed enlargement of the abdomen at Christmas time. She was not a very observant woman, and did not know that there was any enlargement of the abdomen besides that caused by the pregnant uterus. The catamenia, which were usually regular, had ceased for eight months, and she thought herself nearly eight months pregnant. On admission she was anæmic and looked very ill indeed. The pulse-rate was 135 per minute; the temperature was about 101° F. at night; her respirations were from 28 to 36 per minute, and she had a severe cough and a good deal of dyspnœa. The abdomen was filled by a large swelling which bulged into the right flank. A deep sulcus could be felt at the upper pole of the swelling, dividing a larger part on the right side from a smaller on the left side, which was evidently the uterus, as contractions could be felt in it. The urine contained a large quantity of albumin and some granular casts. Rhonchi were heard all over the chest. The swelling in the right side of the abdomen was tense, dull on percussion, and so tender that only the gentlest palpation could be used in examining it. The resident accoucheur thought at first that it might be a large hydronephrosis and called in one of the surgical registrars, who wisely decided that no operative interference was indicated. The os uteri admitted two fingers. About thirty hours after admission a female child was born dead. The abdomen was so tender and painful that the patient could not strain, and, as suprapubic pressure could not be borne, the placenta was extracted from the vagina by pulling on the cord. I saw her soon after the termination of the labour, and found a large tumour filling up the right side of the abdomen, apparently adherent to the anterior abdominal wall, tense and acutely tender. It was now quite free from the loin, and I made a diagnosis of an inflamed ovarian cyst. No vaginal examination was made as the patient had just been delivered and the tumour was evidently too high up to be felt from below. The patient's general condition seemed to me to be too bad to warrant an abdominal section on that day, and I decided to wait a few days and then to operate, with spinal anæsthesia if necessary. The late Dr. Maxwell saw her and agreed with my diagnosis. I saw her again two days later, and found a considerable improvement in her general condition. The tumour was still acutely tender, but felt more definitely cystic than before. The resident accoucheur thought it had become rather smaller, but it seemed to me that as the uterus diminished in size the tumour was able to descend a little. On February 22, the patient's condition had improved sufficiently to warrant the administration of a general anæsthetic, and I operated, expecting to remove an inflamed ovarian cyst. On cutting through the aponeurosis in the middle line of the abdomen the tissues were seen to be blood-stained, and when the tissue between the recti was incised old blood escaped. I found that the tumour was entirely in the abdominal wall. There was a cavity behind the right rectus muscle, extending up almost to the ribs and outwards for at least 6 in. from the middle line, which admitted the hand easily and allowed it to move about freely. The cavity was filled with blood which had evidently been shed several days before, as the clot was firm and old. There were nearly 2 lb. of blood. The exact anatomical position was difficult to determine; I think that it was between the transversalis muscle and the transversalis fascia. The peritoneal cavity was not opened. I washed out the cavity with saline solution and then swabbed it dry with gauze. The question then arose, What was the best way to deal with the cavity? To put in a drainage tube, to make a counter-incision towards the flank, or to sew everything up? I compromised by sewing up in the usual way, but inserted a very small drainage tube, which was brought out through the middle of the wound. A good-sized pad was put over the right side of the abdomen and a tight binder applied. The tube was removed on the third day. The wound healed perfectly and the abdominal wall looked and felt normal when I examined it on the fourteenth day. I think that a correct diagnosis in this case was almost impossible because of the extreme tenderness. A trial of the ordinary method of diagnosing that the tumour was in the abdominal wall was out of the question.

Case II.—A day or two before the first patient left the hospital I had a similar case under my care. The patient was sent in by my late colleague as having a twisted ovarian tumour. She was aged 39, had had one child six years previously and had had no pregnancy since. Two weeks before admission she experienced severe pain in the abdomen after carrying a pair of steps upstairs, and noticed that there was a swelling in the left side of the abdomen. I saw her two or three days after admission, when the characteristic physical signs had evidently become more marked. The swelling was about 5 in. to 6 in. long by 3 in. broad, tapering at each end. Its lower border was 2 in. or 3 in. above the pubic bone. The first thing that struck me was the way in which the swelling stood out from the abdomen, and the second was that its inner border was absolutely straight; it did not transgress the middle line at all. Examination proved conclusively that the tumour was in the abdominal wall.

complained of in the region of the right rectus muscle about the level of the navel. It was noticed that a lump had formed here about the size of an egg, and this slowly increased until, next day, it formed a tumour equal in size to a small coco-nut. The skin over the mass was of a bluish colour, and the tumour itself felt semi-solid in character. By degrees the lump slowly became smaller, and at the end of six weeks had practically disappeared. As no operative interference was called for, the nature of this swelling could not be ascertained with certainty, but from its mode of onset and from its gradual absorption there can be little doubt that it was formed by an extravasation of blood into the tissues round the rectus muscle.

Mr. J. D. MALCOLM: I have seen only one case of this kind. It occurred in a woman past the menopause. An abnormal swelling was found after a strain. It was situated over the gall-bladder region and was confidently diagnosed as something inside the peritoneal cavity. The operation showed an oval cavity in the abdominal wall containing old thickened blood, and the peritoneal sac was not opened. Recovery was satisfactory after temporary drainage.

Dr. AMAND ROUTH: I have seen one case of hæmatoma of the abdominal wall in a woman who for some time had a small umbilical hernia, the ring of which suddenly gave way during a sudden effort, and hæmorrhage took place below the protruding bowel.

Dr. CUTHBERT LOCKYER: The following are the details of a case of hæmatoma of the abdominal parietes occurring during the fifth month of pregnancy. The patient was seen in March, 1908, in consultation with the late Mr. Stanley Boyd and Dr. Mitchell Bruce. Three days previously she was seized with general abdominal pain, which was soon confined to the right side and back. The pain was accompanied by nausea, retching, and frequency of micturition. Attacks such as this recurred several times during the next two days, and on the third day the pain and retching lasted for four hours. In the intervals between the attacks the patient felt quite well except for an "aching in the right side" of the abdomen. There was a tense swelling occupying the right flank, quite apart from, and independent of, the gravid uterus: it was tender and fixed. A skiagram was taken and revealed nothing. There was a trace of albumin and also granular casts in the urine. In the light of the clinical history Dr. Mitchell Bruce thought that the swelling was due to the presence of a renal calculus. Cystoscopic examination showed the bladder and ureteral orifices to be healthy; the ureteral jets were clear, feeble, and infrequent on both sides. At the operation an incision was made over the anterior aspect of the mass in the right flank, and as soon as the flat abdominal muscles were divided a large hæmatoma was discovered in the extraperitoneal connective tissues. These tissues were dissected up by blood-clot, which tracked round to the outer aspect of the flank. No explanation could be found for such a curious lesion, but as there had been two operations (also during pregnancy) for appendicitis (in May, 1904, and in January, 1905)—i.e., three years previously — it was suggested that some of the old chocolate-coloured blood which was now found might have been due to the latter of those two operations. The wound healed, and the patient went to term. During the remainder of the pregnancy careful dieting was necessary owing to the persistence of albuminuria and a low percentage of urea. Labour at term was spontaneous, the child was stillborn, the presentation a breech. As four out of the seven cases of hæmatoma related by Dr. Russell Andrews occurred in pregnant women, I should like to raise the question of an inter-relationship between this blood-lesion and the gravid state. In two cases—the first of Dr. Andrews's series and the one I now refer to—there are many points of resemblance. In each there was a tender, dull swelling in the right flank, and also albuminuria and granular casts. In each a renal lesion was diagnosed. In each the tumour was adherent to the anterior abdominal wall and *old* blood escaped through the abdominal incision. Finally, in each case the child was born dead. In these two cases it seems quite reasonable to infer that changes occurred in the blood-stream, the nature of which was to be found in the coexistence of pregnancy. Schmorl and others have shown that in eclampsia pulmonary emboli, containing syncytial masses, have been found; and where such emboli are present local hæmorrhages result. It is evident that histological proof—i.e., the demonstration of the presence of chronic (syncytial) emboli in large parietal hæmatomata—is never likely to be forthcoming; but it seems fair to assume that these lesions are yet another example of the morbid processes which can be brought about by placental products.

Dr. ANDREWS (in reply): I think it is possible that some cases of painful swellings of the abdominal wall during pregnancy diagnosed as desmoids are really cases of hæmatoma of the abdominal wall.

(*June* 8, 1916.)

Ectopic Pregnancy (probably Primary Abdominal).

By FREDERICK J. MCCANN, F.R.C.S.

THE recent researches on the embedding of the human ovum and the definite proof of the existence of ovarian pregnancy established by quite a number of recorded examples have been the means of altering the attitude which has hitherto been adopted towards the possibility of primary abdominal pregnancy.

It is now affirmed that the ovum will embed itself in any patch of connective tissue capable of supplying its nutritional demands. That a pregnancy is primarily abdominal is difficult to prove, but it is also difficult in certain examples to disprove; for in the light of modern knowledge we can no longer cling to the old statement that "all cases are primarily tubal."

If, further, a detached ovum (and therefore a damaged ovum) can become implanted and grow on the peritoneal surface, why not a fresh ovum? Now the situation in which this implantation would be most likely to occur is the upper part of the posterior surface of the uterus. An entirely erroneous impression of the position of the appendages is apt to be gained by a study of illustrations as well as by examination of post-mortem specimens. In the healthy living woman the tubes are curled around the ovaries, and the ovaries are in close proximity to one another and to the back of the uterus. There are, of course, variations in position within normal limits, but their close proximity is maintained and the ovaries may be actually in contact with one another as well as with the posterior surface of the uterus. It is further necessary to suppose that there has been damage to the uterine peritoneum, as the healthy peritoneum is alleged to exert a protective function. There are, I fancy, few parous women who escape a microscopic if not a macroscopic damage to their peritoneal epithelium. Further the ovum has become implanted at the fimbriated extremity of the tube, on the surface of the ovary, in a Graafian follicle, and, as demonstrated by one of my own specimens, in the functionally active portion of an ovary the seat of a cystoma.[1] It is therefore not difficult to imagine that it may become implanted in the posterior surface of the uterus.

As a contribution towards the study of this subject let me record the following example: Dr. Huston, of Harrow, has very kindly furnished me with some facts concerning the patient's previous history which I give in his own words: "She was aged 35, and had had three confinements, all, as I understand, normal and of short duration, the last two years ago. Her menstruation ceased at the end of July, 1915. In August and September, 1915, she had an attack of meningitis, probably cerebrospinal, although the meningococcus was not found. I was first called to see her on Friday, April 28, 1916, and was informed that the 'waters' had come away the previous evening while the patient was at tea. There had been very slight labour pains, but these had passed away, and from the description it was doubtful whether they were labour pains or not. During the night the patient had been sick several times. The bowels had acted well with enema. She complained of pain in the epigastrium, but no labour pains. On examination she was found to be in fairly good general condition, colour good, pulse 96, abdomen apparently that of a woman at full term. The child could not be definitely felt by abdominal examination although there was a hard mass in the left side which suggested the head. No movements of a fœtus could be felt, although she stated that she felt movements distinctly up till the preceding day. On vaginal examination the os was only enough dilated to admit the tip of one finger. No presenting part could be felt and there was no external hæmorrhage."

---

[1] *Proc. Roy. Soc. Med.*, 1913, vi (Obstet. Sect.), p. 229.

On Saturday and Sunday her condition remained much the same, her chief complaint being epigastric pain, vomiting, and sleeplessness. On Sunday morning about two teaspoonfuls of blood had been passed *per vaginam*. No decidua had been expelled.

On Monday, May 1, I was summoned to see her by Dr. Huston as her condition had become worse. She was a small, pallid, spare woman and was sitting up on a chair with her feet resting on the edge of her bed. She complained of pain in the epigastrium, and informed me she had been unable to retain any food. A monthly nurse was in attendance and all preparations had been made for her expected confinement. She was moved on to her bed with some difficulty because any attempt at movement seemed to cause considerable abdominal pain and distress. The abdomen was much distended and there was considerable venous engorgement visible in the abdominal walls. The abdomen was extremely tender on palpation, especially on the left side over the position of the fœtal head and at other points where the fœtus was palpable. It was, however, difficult to make a detailed examination of the abdomen because of the extreme tenderness as well as the intestinal distension. The latter was so marked that what I took to be the transverse colon was visible and palpable, lying across the upper part of the abdomen. The outline of the uterus could not be defined as the woman at once resented any attempted pressure. The breasts were somewhat atrophied, and in appearance were not suggestive of pregnancy and no fluid could be expressed from either nipple. On vaginal examination well-marked venous distension and blue discoloration were noted. The cervix was much softened and drawn upwards, and the os uteri, about the size of a five-shilling piece, readily admitted the finger. No presenting part could be felt on vaginal examination. Bimanual examination was unsatisfactory for the reason already given. She had an inguinal hernia on the right side and was wearing a truss. When the truss was removed and the hernia examined there was considerable local tenderness and the hernia could not be completely reduced.

From my examination I came to the conclusion that the patient was pregnant, but that the fœtus was lying obliquely in a thin-walled uterus, and that her acute symptoms—distension and sickness, &c.—were due to a partial obstruction of the intestine in the hernial region. I gave directions as to feeding and ordered a sleeping draught, for she had been awake for three nights, and an enema of castor oil, turpentine, and soap and water, also recommending that if she did not improve she should be admitted into Harrow Cottage Hospital.

I saw her again two days later after her admission into the hospital and found her condition somewhat improved. She had a better colour, her pulse although rapid was better filled, and as food had been withheld her sickness had ceased. Her bowels had acted well and in consequence the intestinal distension had decreased.

In the hospital she was under the care of Dr. Lambert, who had also seen her at her own home, and he agreed with me in thinking that her general condition had improved.

I made a further abdominal examination, but was still unable to define the outline of the uterus owing to the tenderness and intestinal distension. The tenderness was still most marked when pressure was made on any part of the fœtus. I again advised a policy of delay, and although it occurred to my mind that the rupture of the uterus was a possibility, the history and the absence of signs of internal hæmorrhage made me decide against it.

Four days later I was summoned by Dr. Lambert, who informed me that the woman had not improved and that he wished me to see her again. When I saw her she looked pinched and anxious, her pulse was 130, and she informed me she could not sleep. I again examined the abdomen and succeeded for the first time in palpating the uterus as both the abdominal tenderness and the intestinal distension had markedly diminished. It was possible to palpate the bones of the fœtal head, which imparted a curious crackling sensation to the examining fingers. Bimanually the uterus was pushed somewhat to the right side and corresponded to the size of a five months' pregnancy, and as the fœtus was obviously extra-uterine, I decided to open the abdomen without further delay. For two days an offensive purulent discharge had issued from the vagina and the general condition of the patient suggested the presence of a severe toxæmia.

Operation, May 7, 1916: A free median incision was made, and as soon as the peritoneum at the upper part of the incision was opened a small quantity of black blood clot presented. On enlarging the incision the umbilical cord, of a dark slate colour, bulged into the wound. The hand was introduced and a rapid exploration made. The fœtus was grasped by the legs and withdrawn without difficulty. It was a female, apparently of full development, and the skin of the chest was beginning to peel. The uterus was at once brought up into the wound and was found to be enlarged to about the size of a five months' pregnancy with a well-developed placenta, to which the umbilical cord was attached, firmly inserted in its posterior surface slightly to the right side. As the broad ligaments on either side were free the uterus and placenta were brought into view without difficulty. A strong odour of ammonia was perceptible during the operation, suggestive of the presence of urine in the peritoneal cavity, although the amount of intraperitoneal fluid was inconsiderable. The intestines were carefully packed off with sponges and a rapid supravaginal hysterectomy performed, leaving the appendages *in situ*.[1] The placental attachment on the lower part of the uterus seemed to shrink gradually, leaving the floor of Douglas's pouch covered only by the remains of the amniotic sac. Further remnants of the amniotic sac, brownish-black in colour, were found on the posterior abdominal wall, the utero-vesical pouch, the descending and pelvic colons, the transverse colon and omentum, the ascending colon and the peritoneum lining the abdominal wall. The peritoneum was thickened and dark in colour. The abdominal incision had opened into the amniotic sac, but the sac had evidently ruptured before the operation. The membranes attached to the placenta maintained their normal colour and had fallen over its upper surface like a cover. The amniotic fluid had evidently become absorbed, there being only some dark sanious fluid in Douglas's pouch. Thus although the amniotic sac had ruptured before the operation it was not difficult to reconstruct the arrangement of parts (fig. 1). Moreover, it was interesting to note that although the fœtus was dead and its skin beginning to peel, yet there were no adhesions of intestine or omentum to prevent its rapid and easy extraction. The small intestine seemed to be packed away in the upper part of the abdominal cavity. Some old blood clot[2] was also cleared out of the utero-vesical pouch, and as much of the amniotic sac as was readily detachable was removed. Two large drainage tubes were introduced into Douglas's pouch and brought out at the lower end of the wound, while a veil of gauze was inserted above the tubes to assist in isolating the area to be drained. The abdominal wall was then closed and the dressings applied. The woman bore the operation well and her pulse became slower and better after the fœtus and uterus had been removed. It was 96 at the end of her operation, whereas the average rate had lately varied between 120 and 130. Her good condition was largely due to the fact that the total blood lost during the operation probably did not amount to more than a tablespoonful. The anæsthetic was ably administered by Dr. Lambert, whilst Dr. Pennefather rendered me valuable assistance at the operation.

---

[1] The right tube, which was not identified, was probably incorporated with the placenta.

[2] The bleeding probably had its origin in a slight detachment of the placenta at its anterior border.

After-history: At my visit on the day following the operation, the woman looked better and expressed herself as feeling better. The pulse-rate was 98. She had had no sickness nor abdominal distension. Her tongue was dry and she complained of thirst, still her general condition was as good as could be expected after such a severe operation. On the next day her general condition was much the same. I did not see her again, but was informed on the fifth day after the operation that her condition became very bad and that she gradually sank and died. For twelve hours previous to her death she was almost maniacal, shouting and exhibiting extreme restlessness. She had had no sickness since the operation. There had been no abdominal discomfort and the bowels acted well. A post-mortem examination was not permitted.

DESCRIPTION OF THE SPECIMEN.

The specimen consists of the fœtus and placenta, together with the uterus, removed by supravaginal hysterectomy.

The fœtus is a female, weighing 7 lb., and has reached full development within the abdominal cavity of the mother. The trunk and limbs are perfectly developed but the head is enlarged, suggesting early hydrocephalus. The skin of the trunk is beginning to peel and is readily separable on handling, whilst it is also undergoing colour changes, bluish-black and greenish-yellow, indicating the presence of decomposition.

The umbilical cord is normally developed and is attached to a large well-formed placenta. The attachment of the umbilical cord is excentric, being situated towards the left side. The main placental mass is perched like a cap on the upper and back part of the uterus, whilst it spreads laterally outwards and still more downwards so as to hide the uterine surface completely. The main placental mass measures transversely 5 in., antero-posteriorly $3\frac{1}{4}$ in., whilst the vertical measurement is $6\frac{3}{4}$ in.

The two layers (chorion and amnion) can be demonstrated in the membranes attached to the placenta. Owing to the peculiar arrangement

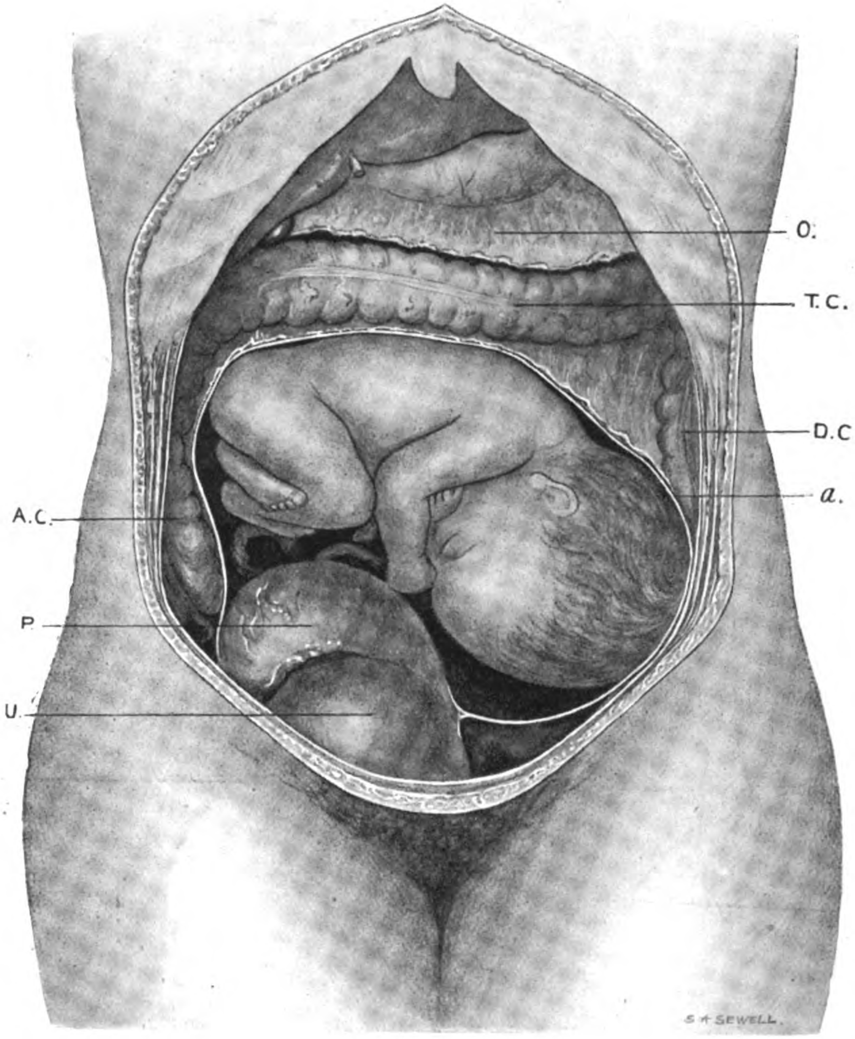


FIG. 1.

Drawing, illustrating the position and relations of the fœtus, placenta and membranes. **A.C.**, ascending colon; **D.C.**, descending colon; **O.**, omentum; **T.C.**, transverse colon; *a.*, amniotic sac; **P.**, placenta; **U.**, uterus.

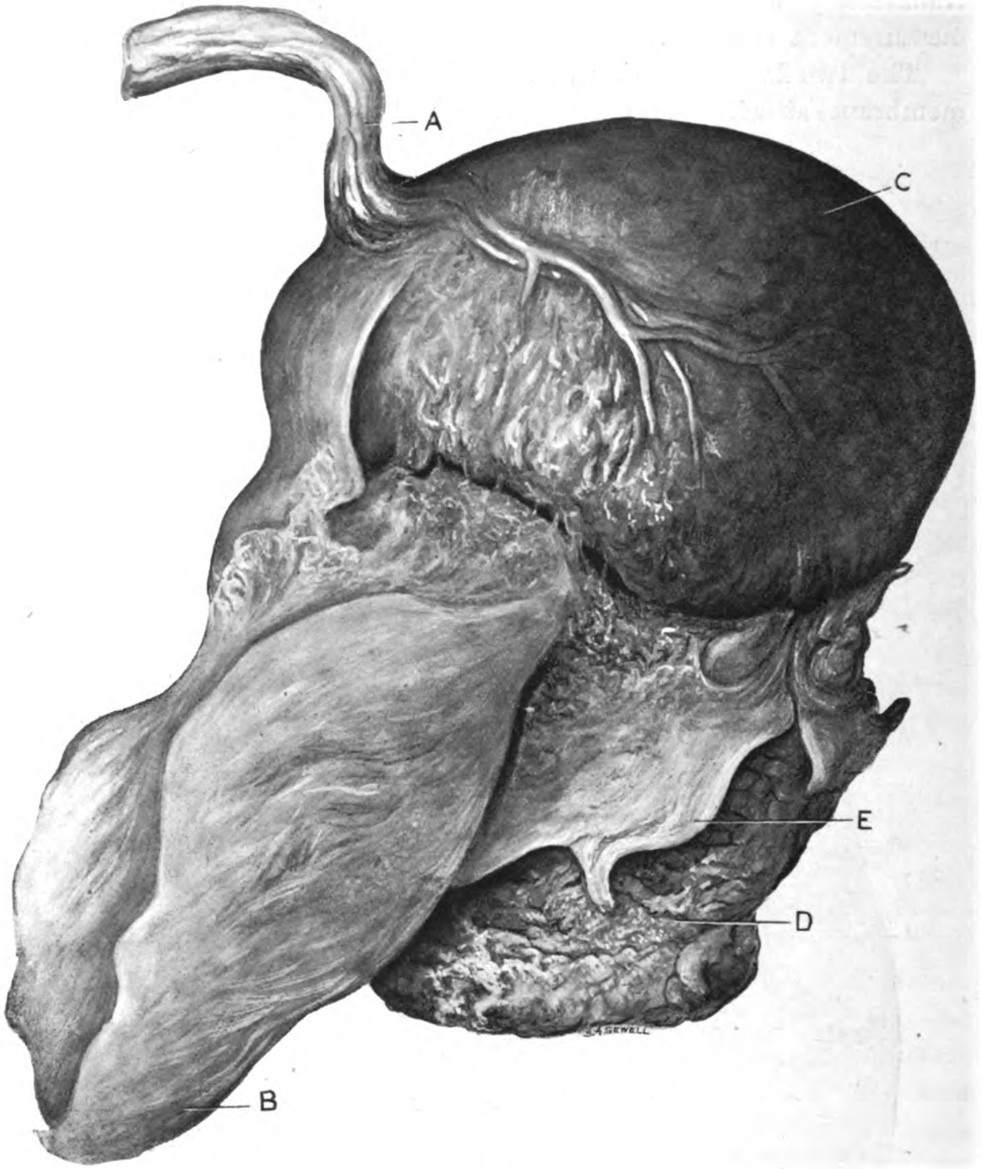


FIG. 2.

Ectopic pregnancy. Posterior view of the placenta attached to the fundus and posterior surface of the uterus. **A**, the umbilical cord with excentric attachment; **C**, the main placental mass; **B**, amnion; **E**, chorion; **D**, the portion of the placenta which was spread over the lower uterine segment posteriorly. The membranes were not attached to the edge of this part of the placenta.

of the membranes there is a part of the placenta at its lower extremity to which the amniotic sac is not attached (fig. 2). This part gradually shrinks away on the lower segment of the uterus posteriorly. The appearance of the placenta is otherwise normal and it is firmly inserted on to the posterior surface of the body and fundus of the uterus.

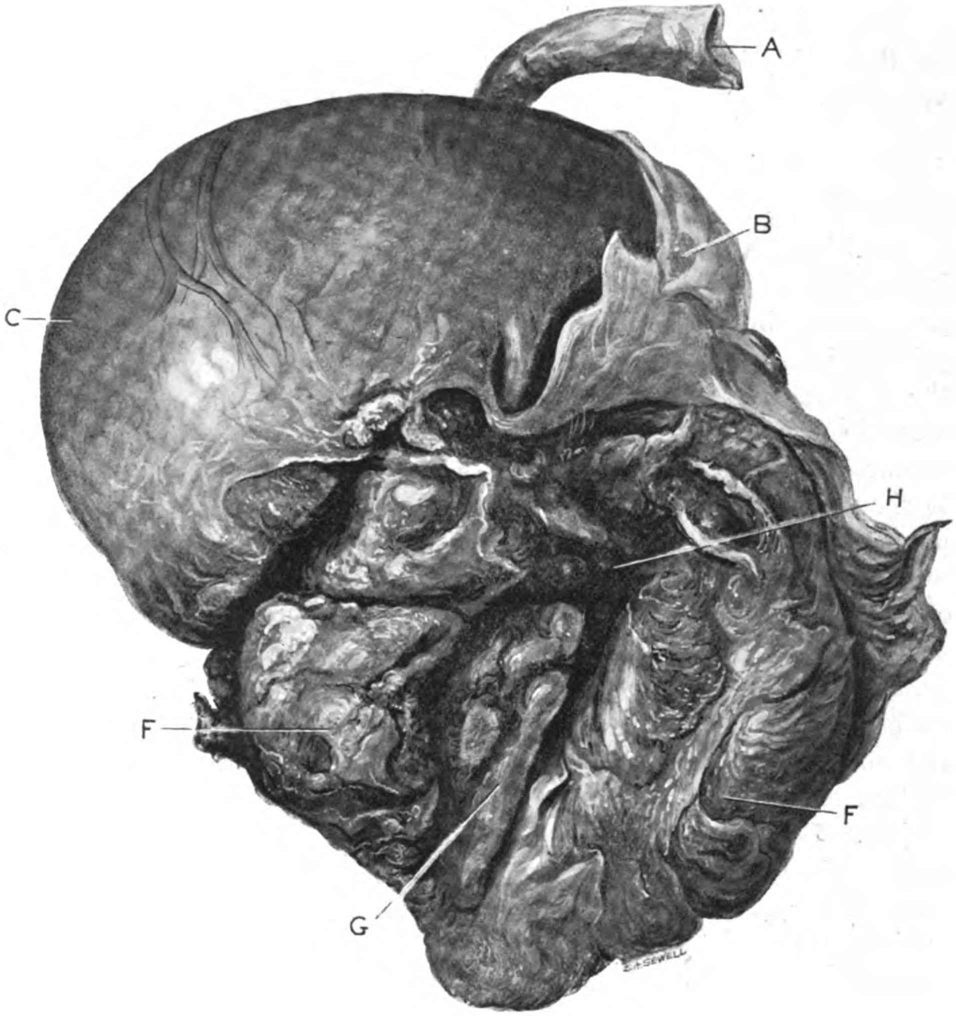


FIG. 3.

Ectopic pregnancy. Placenta and uterus, anterior view. **A,** umbilical cord; **B,** amnion; **C,** placenta; **H,** uterine cavity; **G,** myomatous polypus projecting into the uterine cavity; **FF,** uterine wall. An oblique section from above downwards and backwards was made at the operation; this enabled the placenta to be removed uninjured.

The uterus is enlarged and was, as stated, about the size of a five months' pregnancy, but it has contracted considerably since immersion in formalin. Its walls are about 1 in. in thickness and its cavity is widely patulous with smooth lining, and contains a fibro-adenomatous polypus about the size of a walnut springing from the postero-lateral wall on the right side (fig. 3). Did the polypus interfere with the occurrence of intra-uterine pregnancy?

Thrombotic changes had taken place in the blood-vessels, especially on the right side, which tended to diminish the hæmorrhage at the operation. The uterine artery on the right side was not identified.

REMARKS.

An historical study of the subject of abdominal pregnancy reveals the interesting fact that the older writers divide what they termed ventral pregnancies into two classes, the primary and the secondary. By primary is meant that class in which the fœtus is developed at once in the peritoneal cavity, while in the second class are included all those cases in which the sac, originally located in the tube or ovary, has ruptured and the escaped fœtus goes on developing in the abdomen. It should further be added that they believed in the existence of ovarian pregnancy. I have no doubt their views will be substantiated by further research and experience, as has already been accomplished by the study of ovarian pregnancy, and it will be established that, although primary abdominal pregnancy is rare, yet that it does occur in the human female.

I do not say the example here recorded is or is not a primary abdominal pregnancy, for I can neither prove it nor disprove it, but I place it on record as a contribution towards the elucidation of this subject. Let me, however, again refer to one or two points in the clinical history. With the exception of the illness at the commencement of her pregnancy the patient had no acute pain, sudden illness or fainting during the whole course of her pregnancy, and her husband informed me that she was remarkably well; and in this regard the history corresponds closely with that of the case recorded by the late Mr. J. W. Taylor in the *Transactions of the Obstetrical Society* for 1897. He concluded that a gradual erosion or giving way of the upper part of the tube had permitted the escape of the ovum into the abdominal cavity. In other words, his theory was made to fall into line with the views as to causation which were upheld at that time. But with our present knowledge it is equally feasible to regard his case as one of primary abdominal pregnancy, a view which is strengthened by the clinical history. The absence of abdominal illness at any time during the course of such a pregnancy, is in my opinion, strong presumptive evidence in favour of a primary abdominal implantation of the ovum. Now Dr. Huston assures me that during the illness in August and September, 1915, when he was in attendance, and which has already been mentioned in the previous history of the case here recorded, there was no suggestion of any abdominal trouble. Moreover, from a study of clinical histories it would appear that the abdominal fœtus has had a severe struggle to maintain its independent existence.

It is, however, remarkable that a woman can enjoy good health during the gestational period, when the fœtus is in her abdominal cavity covered only by its amniotic sac. Some recorded examples of abdominal pregnancy speak of the fœtus being free amongst the intestines. This I believe to be a faulty observation, for I should imagine that no fœtus would reach its full development unless enclosed in a sac, and as the sac is as a rule opened when the abdominal cavity is opened it is easy to conclude that the fœtus is lying free. Further, when the sac ruptures or the liquor amnii becomes absorbed, why do not the omentum and intestines adhere to the decaying fœtus? When the gestation is much prolonged this adhesion has been observed, but it would appear that for a long time no adhesions are formed.

Again, what is the explanation of the rush of waters when false labour set in? The amount was sufficient to soak the bedclothes when the woman returned to bed. Did they come through the Fallopian tube or tubes? In Taylor's case what he took to be the fimbriated end of the Fallopian tube was incorporated with the placenta, but the remainder of the tube could not be traced. I have not been able to trace any connexion between the right Fallopian tube and the placenta, but the tube on the left side was free and doubtless patent. Owing to the rapid growth of the placenta it is easy to imagine that a delicate structure like the Fallopian tube could be, so to speak, overgrown and incorporated with the placental mass, and this, I think, is worthy of consideration as an alternative to the view that the destruction has been due to tubal rupture.

The ovary on the right side could also be identified, but it is quite possible too that this organ could be destroyed by the placental growth. The ovary was smaller than that on the left side, and was sclerosed and adhered to the broad ligament. Whether this had resulted from any interference with the ovarian circulation it is impossible to say.

The left ovary was free and of normal size, and was covered on its inner surface by the amniotic sac. The external surface of the left ovary and the fimbriated end of the left tube were outside the amniotic sac—at least no trace of the sac was observed on them.

SURGICAL TREATMENT.

I have already recorded an example of abdominal pregnancy in which a living fœtus at four and half months was successfully removed.[1] The placenta was implanted in the posterior surface of the uterus, the floor of Douglas's pouch, and on the pelvic colon. Previous to the removal of the placenta the main sources of vascular supply were controlled, including a large artery coursing down the posterior surface of the uterus, and then the placenta was rapidly separated and the placental site at once plugged with gauze, the raw surface on the intestine was treated by folding in the wall of the gut and overstitching with catgut. A gauze plug was left in the pelvis and subsequently withdrawn during convalescence. Thus in dealing with the placenta two important principles should be followed: (1) To control the main vascular supply by preliminary ligature; (2) to separate the placenta rapidly.

In the case here recorded the position of the placenta was ideal as regards surgical treatment, for by means of a supravaginal hysterectomy the vascular supply was controlled and the placenta itself removed. It was the toxic condition of the patient that militated against her ultimate recovery. The advice to wait until the child is dead and the placenta thrombosed is hardly in harmony with the trend of modern surgery; moreover, the presence of infection is a serious factor which may mar the success of a future operation. I think, therefore, that if the principle of preliminary ligature of the vascular supply be properly carried out there should be little difficulty in dealing with the living placenta.

When an abdominal pregnancy is diagnosed with a living child, should we wait until the child is viable? It is true that living children have been extracted and have survived, but there is no evidence concerning their future growth and development, and as many of the children in recorded cases have possessed deformities I believe the best practice is to operate at once as soon as the diagnosis is made.

---

[1] *Proc. Roy. Soc. Med.*, 1910, iii (Obstet. Sect.), p. 149.

In conclusion, it is a source of great satisfaction to find that it is from investigations made in this country that many of the interesting problems in the life-history of ectopic gestation have been unravelled, and that their elucidation forms a brilliant chapter in the history of British gynæcology. The name of Lawson Tait will for ever stand forth as a pioneer in the surgical treatment.

BIBLIOGRAPHY.

McCann. *Proc. Roy. Soc. Med.* (Obstet. Sect.), 1913, vi, p. 229; and 1910, iii, p. 149.
Parry. "Extra-uterine Pregnancy," 1876.
Taylor, J. W. "Extra-uterine Pregnancy," 1899.

(*June* 8, 1916.)

Acute Hepatic Toxæmias complicating Pregnancy and Labour.

By John Phillips, M.D.

Of late years much attention has been paid to the bacterial infections of the liver, but no marked stress has been laid upon the liability of the liver, and possibly of the pancreas, to become specially infected during the pregnant condition. Moreover, no discussion on this important subject appears to have taken place at any of the meetings of this Society. The chief infections appear to be from the colon bacillus, and, less frequently possibly, from the staphylococcus and the streptococcus. There is no doubt in my own experience that the first is the most frequent; and the five cases which I have detailed below represent all my experience of this complication. In one case (Case I) a question of opinion as to whether the disease was acute yellow atrophy or an acute ascending toxæmia has arisen. The symptoms are so much alike that I have ventured to report this case, with post-mortem notes, somewhat fully to show the difficulty of making a certain diagnosis.

Case I.—The patient, a primigravida, aged 32, had been married nine years, but with no previous pregnancy. She had diphtheria four years previously, but it was followed by no bad sequelæ. She was always a delicate girl and wore leg-irons when young. When first seen with Dr. Des Vœux her height was 5ft. 2½ in.; she was a small, thin, but well-formed brunette. External pelvic measurements were found to be: interspinous, 8¼ in.; intercristal, 9½ in.; external conjugate, 6¾ in. During the whole of the pregnancy she suffered from much sickness and with hot burning pain (like severe indigestion) behind the sternum, especially at night. The urine contained neither albumin nor sugar. She was watched regularly after the thirtieth week, and at the thirty-second week a breech presentation changed suddenly to a vertex (*la culbute*), the patient herself being conscious of it. At the thirty-fourth week the vertex barely entered the brim; chloroform was therefore given as the patient was intolerant of pain. The cervix was found to be long and rigid; it was dilated sufficiently to introduce the finger, and a bougie was then inserted between the membranes and the uterine wall. Labour pains came on forty-eight hours after the insertion of the bougie and labour speedily terminated without any difficulty, the child being stillborn for no apparent reason. The progress of the patient after labour was very unsatisfactory, constant sickness being the most marked symptom. At the end of eighteen hours she began to vomit brownish blood; faint jaundice then set in for a few hours and nearly disappeared later, and she died forty-eight hours after labour, the temperature rising to 110° F. shortly before death, having been down as low as 93° F. twelve hours previously, the pulse becoming increasingly rapid (90 to 164 per minute); her tongue was dry and cracked, sordes on the lips, her aspect was drowsy, and she was very restless and continuously moaning. Treatment consisted in administering copious subcutaneous injections of saline with dextrose, but they seemed to have no effect whatever on the progress of the disease.

Post-mortem by Dr. Trevor sixteen and a half hours after death: Blue staining of the face and abdominal wall present. The stomach showed considerable gastritis, as evidenced by adherent tenacious mucus and some pigmentation. There were small submucous hæmorrhages and about half a pint of fluid blood mixed with the contents of the stomach. There were lines of blood pigment over the longitudinal veins at the lower end of the œsophagus. The spleen was small. The liver weighed 36 oz. Most of the right lobe showed chronic venous engorgement, but there were some distinct areas of apparent acute yellow atrophy.

Microscopical examination: The capsule of the liver shows a fine wrinkling and is thrown up into small folds. Under the low power, the lobular arrangement can in many places still be made out owing to the preservation at the periphery of the lobule of a very narrow zone of liver cells, which stain fairly well. In these areas the central vein of the lobule is distended and the liver cells immediately surrounding it have necrosed and practically disappeared—a definite nutmeg change. In the intermediate zone liver cells in all stages of degeneration are seen. Under the high power, some show hydropic degeneration, others cloudy swelling, and others, again, are merely masses of vacuolated protoplasm with no visible nuclei. Many of the cells are loaded with granules of bile-pigment. The normal arrangement of the columns of the liver-cells is destroyed and the cells lie separate and distinct. The capillary network is distorted and not easily made out. Scattered throughout the section are large cells loaded with dark granules of large size. Some of these appear to be in the capillaries and are phagocytic cells with inclusions of cellular and nuclear débris. In these areas the picture is that of an advanced nutmeg liver together with superadded degeneration of the liver substance. In the yellow parts of the liver, the microscopical changes are similar, but here the topography of the section is blurred and the liver lobules can no longer be made out. Here and there in the portal spaces the connective tissue is cellular, but no diffuse increase in the interstitial tissue of the liver has occurred, neither are there any newly formed bile canaliculi. There are, however, in those places where the liver cells are fairly well preserved, isolated cells here and there containing two nuclei. No crystals of leucin or tyrosin are seen in the sections. On the whole, the appearances are not typical of acute yellow atrophy, but they might be interpreted as being those of a very early or commencing stage. I would prefer to regard them myself as degenerative and associated with some general grave toxæmia, for, as the material for examination was not obtained until some seventeen or eighteen hours after death and the patient died with a temperature of at least 110° F., I am of opinion that much of the change present is of post-mortem occurrence and of autolytic nature. The disturbance of the relationship between the liver cells makes a certain statement as to the condition of the intercellular bile-ducts impossible, in spite of careful examination with an oil-immersion objective, but it is more than likely, seeing the loaded state of many of the cells with bile, that they were obstructed. The larger ducts in the portal spaces certainly show catarrhal change. The jaundice would then be of hæmo-hepatogenous type such as is met with in many grave septic or toxic states.

Case II.—A primigravida, aged 32, was confined of a stillborn child weighing 9 lb., forceps being applied at the brim ; light chloroform anæsthesia carried out for about six hours (on and off) and full anæsthesia for about two hours ; no difficulty with the placenta. For twenty-four hours the temperature remained normal and the pulse quiet. The urine had been examined and found normal just before labour. On the second day there was slight general jaundice, the urine being markedly stained with bile, and she passed dark-coloured fæces, probably old blood. She then became slightly drowsy and failed to recognize friends around her. The urine was later found to contain much bile and a trace of albumin ; it was also hyperacid. When I saw her in consultation, the pelvic conditions were quite normal ; lochia abundant and of good colour and involution rapid. The patient was a high-coloured brunette, with a slight general tinge of jaundice, very drowsy, not answering questions ; she scratched her face from time to time with her left hand and only swallowed food if placed in her mouth ; the pulse was quick, 130, gradually becoming smaller ; temperature varying from 99° F. to 100° F. The liver was certainly tender, as she flinched when the hepatic region was manipulated. No definite enlargement could be made out. Saline injections had been given continuously without any good effect. She died forty-eight hours after labour, in a comatose condition.

Case III.—A primigravida, aged 23, with general pelvic contraction, was seen on June 29, 1914, when thirty-five weeks pregnant. The breech was found presenting. The patient was accordingly put into a modified Trendelenburg position and an external version carried out. It was then found that the vertex would barely enter the brim; accordingly the cervix was dilated and two solid No. 10 elastic bougies inserted between the membranes and the uterine wall; she was not feeling well at the time and had noticed that her motions were very grey in colour; her temperature was 100° F. and her pulse 94. Within twenty-four hours her temperature went up to 102° F., and it was thought advisable to remove the bougies. Labour came on slowly, and an occipito-posterior position was found; rotation with forceps and delivery resulted in the birth of a healthy female child, weighing 6 lb. A double episiotomy was necessary to save the perinæum. During the next twenty-four hours she was very restless and sick and became slightly jaundiced. A dose of castor oil produced a large white clay-like motion. The sickness and restlessness continued, and the jaundice increased during the next twenty-four hours, lochia and involution meanwhile going on quite normally. Her temperature varied between normal and 100° F. at night, and her pulse varied between 96 and 112. She looked and felt very ill, and on the sixth day a slight deepening of the jaundice occurred. Swabs taken from the cervix on second and sixth day were found to be sterile. Her urine contained a large amount of *Bacillus coli*. Sir Bertrand Dawson, who saw her with me, advised small doses of grey powder and rectal injections of saline solution; but it was not until the sixth day that a little bile was noticed in the motions, and it was not until the twelfth day that they became bile-stained. On the eighteenth day they were normal. Involution was quite rapid, and the lochia ceased at the ordinary time. Her temperature became quite normal about the sixteenth day, her appetite returned, and the jaundice gradually disappeared. The child vomited much yellow mucus during the first twenty-four hours and was jaundiced, this being deepened during the next twenty-four hours; all the vomit was deeply stained yellow, as was also the urine; drowsiness was a marked symptom. No bile came through the bowel until the tenth day, and the jaundice disappeared on the twenty-first day. The patient was confined a second time without any of the complications above mentioned, but the child was even more deeply jaundiced when born than the former one, and for seven days the urine was brightly stained with bile and nothing but meconium and colourless mucus passed by the rectum. It was considered that the child had either bacteriological catarrh or possibly congenital absence of the hepatic ducts. Fortunately the bile appeared the twelfth day in the motions, and about that time the jaundice gradually faded and the patient convalesced.

Case IV.—The patient, aged 20, a primigravida, was under the care of Dr. Lumsden. She was healthy, but most of her life had suffered from bad sick headaches if she got excited or tired. Her husband had developed a few days before her illness began what was thought to be an influenza chill; jaundice developed and was still present at the time of the labour, but he made a good and easy recovery. The patient a few days later got an apparently similar chill, and three to four weeks before term arrived in London feeling, as she said, "desperately ill." The patient had slight yellowish discoloration of the skin and had noticed greyish-white motions for two days. Her sister developed general jaundice three weeks later at the same country residence. The labour was quite normal and easy, being about three or four weeks before full term; very little chloroform was necessary. The child, although premature, was alive and vigorous, the motions passed during the labour were white and constipated, and it was noticed that her slightly jaundiced skin was everywhere very sensitive. During the first twenty-four hours post partum the patient was very sick and declined food, while the icteric tint, which was general, slightly deepened. At the end of forty-eight hours she became drowsy and began to scream more or less continuously, with a few minutes' interval; the head was retracted and she was perpetually rubbing the occiput on the pillow, like a child with tuberculous meningitis. The lochia and involution were normal in every way; the urine was passed unconsciously and a catheter specimen showed bile staining and very marked *Bacillus coli* infection, but no leucin or tyrosin. She was quite unconscious, with marked patellar reflex and a big-toe clonus. On the fourth day the jaundice was deeper, she was more restless, the pulse quicker, and she resisted violently any attempt at rectal nutriment. The temperature varied between normal in the morning and 101° F. at night. On the sixth day the jaundice was less, the screaming had almost ceased, and the head and limbs underwent peculiar rhythmic movements, so that the skin became quite red and sore. On the seventh day the screaming had quite ceased, the jaundice of the skin was less, but the urine was still deeply stained and the motions were white. She now became semi-conscious, but the rhythmic movements were still present. The next day she was quite conscious and taking food naturally. On the ninth day, at the site of the puncture in the right thigh, made for saline injections, a large abscess formed without any corresponding rise of temperature; the pus on being let out gave a pure culture of *Bacillus coli.* For about three weeks, and until her complete recovery, an autogenous vaccine of the *Bacillus coli* was administered regularly to the patient. Her mental condition was peculiar: she remembered arriving at the house just before the labour and seeing her own doctor, but forgot everything afterwards for eight days, nor has her recollection of what occurred during that interval returned. The perineal sutures had not united, and later a posterior colporrhaphy was performed with a good result. The treatment consisted in continuous subcutaneous injections of saline, dextrose, and when possible rectal salines. Paraldehyde was the only drug which appeared to afford her any rest or sleep; it was given in large doses. The temperature was never high, being 101° F. on the fourth day, and it became quite normal on the tenth; the pulse varied between 100 and 130 during the whole of the illness. The child was not born jaundiced, nor did it develop this condition later.

Case V.—A very strong and healthy primigravida, aged 34, was under the immediate care of Dr. Beauchamp. Twenty-four hours before labour started she felt very unwell and was sick. She had noticed the motions were very pale ("like clay"). She was sick during the whole of the labour, bringing up at first a frothy mucus of a bright yellow colour. At the end of twenty-four hours, and during the second stage, she vomited a large amount of dark brown material, which contained no food and was proved to be altered blood. The presentation was a vertex (occipito-posterior) in the third position; rotation with the forceps and delivery were carried out. During the operation she vomited nearly half a pint of the same black material. She complained of severe pain behind the sternum; twenty-four hours after labour she was very apathetic, with a pulse of 94 but a normal temperature. The liver was enlarged and the hepatic area tender to the touch. Jaundice of the conjunctivæ and skin now developed, and emphysematous crackling appeared over the right neck and chest, with marked puffiness of the subaxillary region on the same side. She was unable to take any food, was very restless and apathetic, and was sick when any attempt at feeding was made. The actions of the bowels were still clay-coloured. The restlessness continued for another three days, and she still complained of feeling very ill; the urine, which had been very dark brown in colour, cleared up at the end of the twentieth day; bacteriological examination showed the presence of a large amount of *Bacillus coli*. Swabs taken from the cervix on the third day were found to be sterile. The jaundice disappeared and the motions became normal at the end of the third week. The lochia and involution were normal throughout. The child was not jaundiced, but developed a slight attack twenty-four hours post partum.

I have related the above five cases somewhat in detail as they appear to present very distinctive features. Every practitioner is cognizant of the slightly muddy complexion, scarcely amounting to jaundice, with malaise, which frequently attacks the lying-in woman within forty-eight hours of labour, and I have come to believe that many of these are in all probability minor infections as compared with those related above, but of the same type.

Jaundice must be looked upon merely as a symptom, and it occurs more or less deeply in acute yellow atrophy, hepatic toxæmia, Weil's infective disease, late chloroform poisoning, and as the result of certain metallic poisonings—e.g., phosphorus. In a similar manner the slight jaundice occurring in the above detailed cases should be considered as one symptom in a train of a series of graver ones. The yellow staining occurring in these patients is much less than in simple icterus, and I have thought that these cases should be classed under hepatic toxæmia rather than the jaundice of pregnancy, as more indicative of their true pathology.

It will be noticed that only in one case (Case I) was a post-mortem examination obtained, and even in this a definite conclusion was not arrived at, for it will be noted that Dr. Trevor thought that the appearances were not typical of acute yellow atrophy, but that they might be interpreted as those of a very early or commencing stage, while Dr. Rolleston, who saw her with me, in a letter to me on the matter afterwards, says: "In the light of the clinical symptoms, post mortem, and microscopical sections, I regarded the case as one of acute yellow atrophy, fatal at a very early date, probably because the patient had very little resistance."

Case II was probably one of profound toxæmia, due to some hepatic or possibly pancreatic infection, and her condition appeared to be hopeless from the first.

In Case IV several interesting points are to be noted. First of all, the three cases of slight jaundice occurring in one family in the same house within a short time of each other; secondly, the loss of memory of events from shortly before the labour until eight days had elapsed; thirdly, the cerebral symptoms coming on within forty-eight hours of the labour; and, lastly, the proof by bacteriological examination that the poison was due to *Bacillus coli.* The diagnosis of this case was made of an acute ascending infection of the bile-ducts, with cerebral irritation, due to the presence of *Bacillus coli.* This tends to confirm the theory of Bardinet, who, in 1863, declared that jaundice may be produced as an epidemic among pregnant women and describes such an epidemic: of thirteen cases notified, three ended fatally and seven children survived. Kercksig[1] also mentions an epidemic of seventy cases, five of whom were pregnant: two aborted and three died.

Case III was also typical of a similar infection. Here again we have the white motions, irritability and tendency to coma, combined with slight jaundice, while examination of the urine showed the presence in large quantities of the *Bacillus coli.* The symptoms so closely imitated those of late chloroform poisoning that during the earlier days of the illness a diagnosis of that state was made.

In Case V many symptoms of acute yellow atrophy were present, such as the dark brown vomit of altered blood, the tenderness over the liver, slight jaundice, with the sickness, restlessness and apathy so characteristic of acute yellow atrophy. Here, too, the urine was found to be loaded with *Bacillus coli.*

---

[1] *Neues Journ. der pract. Heilk.* (*Hufeland*), 1802.

All the five cases occurred in primigravidæ, and at or about the time of onset of labour; albuminuria, too, as is well recognized, usually occurs more frequently in women pregnant for the first time.

I have notes of two additional labours occurring in the same patient ten and twelve years ago, and before the bacteriology of the puerperium was at all worked out. I am therefore unable to say anything as to the presence or not of the *Bacillus coli* and have not included them in this series; but the patient at both her labours presented all the symptoms of the above five cases, of which I made accurate notes at the time, and of the various opinions which were given by the physicians who saw her. As some slight confirmation of my surmise I may mention that five years ago, while treating this patient for a slight local ailment, I had an opportunity of obtaining a catheter specimen of her urine, and it was loaded with *Bacillus coli.*

The sum total of the five cases shows a fatal result in two cases within forty-eight hours, and recoveries in the remaining three after several days' illness.

With regard to the children, on two occasions (Case III) the child was either born with jaundice or developed it rapidly after delivery, and aroused the suspicion that possibly the bile-ducts might be in some way congenitally stenosed. Two were stillborn without any apparent reason.

The liver, as Rolleston points out, is peculiarly susceptible to morbid changes during pregnancy, and there is reason to believe that necrotic changes in the peripheral zone of the lobules of the liver play a very important part in the production of puerperal eclampsia. Whitridge Williams,[1] in reporting twelve cases of pernicious vomiting of pregnancy and having acute yellow atrophy, insists on a distinction between eclampsia, in which necrosis occurs in the peripheral zone, and acute yellow atrophy, in which this process begins in the intermediate zone of the lobule.

The difficulty of making a differential diagnosis between acute yellow atrophy, malignant jaundice, and the group I have reported will be seen on perusing the five detailed cases. Some confusion of thought appears to exist as to whether acute yellow atrophy and what is termed malignant jaundice are similar or separate diseases. Bristowe[1] describes the leading characteristics of the two former (which he considers one and the same disease) as vomiting, especially of a coffee-ground fluid, due to gastric hæmorrhage, intense headache, irritability and restlessness. The question therefore arises whether the cases I have brought forward should be included among instances of mild acute yellow atrophy. I am inclined to oppose this idea.

---

[1] *Johns Hopkins Hosp. Bull.*, 1906, xvii, p. 71.

As long ago as 1863 the connexion between pregnancy and acute yellow atrophy was recognized, and at a meeting of the Berlin Obstetrical Society in that year an interesting discussion took place. Virchow stated that he had never seen a case of jaundice in pregnancy ending fatally.[2] H. Gideon Wells[3] points out that one of the forms of delayed chloroform toxæmia resembles acute yellow atrophy. In considering this subject, Dr. Harold Low has kindly allowed me to quote from an unpublished paper of his, entitled "So-called Delayed Chloroform Poisoning." The symptoms mentioned show how difficult a diagnosis may become. The exact origin of the condition is still a matter of uncertainty; certain facts, however, are recognized: (1) Prolonged chloroform narcosis produces in animals changes in the liver similar to those of acute yellow atrophy. (2) Acidosis or acid intoxication is present, especially in children, in conjunction with narcosis. (3) In patients dying subsequent to anæsthetization by chloroform, the liver sometimes shows well-marked degeneration similar to that observed in acute yellow atrophy or phosphorus poisoning. Clinically, in adults, jaundice may be marked, but it may not infrequently be absent, even in fatal cases. There are doubtless many cases which recover, although it is extremely difficult to make a definite statement on this point. The cardinal symptoms appear to be: (1) Vomiting coming on some hours or even days after the operation (in contradistinction to that arising immediately after or before the patient comes round from the anæsthetic). The vomit is of a peculiar coffee-ground appearance (probably due to the presence of blood). (2) The pulse steadily rises in rate and becomes progressively feebler. (3) The mental condition is one of apathy, with attacks of intense restlessness and excitable delirium (mostly, however, observed in children). Dr. Harold Low concludes by saying: "The more I have read the less satisfactory are the theories as to what part the anæsthetic plays. The probability is that there is an unknown factor present in certain cases where chloroform has been given, producing the necrotic changes in the liver, the anæsthetic by its action upsetting a faulty metabolism."

---

[1] "Theory and Practice of Medicine," pp. 794 *et seq.*

[2] *Monatschr. f. Gebürtsk.*, 1863, xxi, p. 90.

[3] *Arch. of Intern. Med.*, Chicago, 1908, i, p. 594.

In my cases all were subjected to anæsthesia—Case IV very slightly, the other four deeply; but I must point out that in three cases (I, IV, and V) symptoms of the illness had already commenced, so that whether instances of acute yellow atrophy or ascending hepatic toxæmia, they could not have been caused by the chloroform, although this drug may probably have aggravated them.

The five cases I have detailed above are the only ones I have encountered among just over 2,000 carefully recorded cases of labour in private practice. With regard to acute yellow atrophy, statistics are of very little value. Lomer reported 143 cases of this disease and states that thirty of them were pregnant. Legg found twenty-five pregnant women among sixty-nine cases of acute yellow atrophy, while Späth only encountered it three times in 14,061 pregnancies. As regards the children, Lomer reported forty-five stillbirths in fifty-seven pregnancies, and in sixty-two cases six children were born icteroid.

The treatment adopted has been detailed in the relation of each case, and although nothing curative was suggested, yet the adoption of the remedies mentioned probably helped those patients who recovered to a more rapid convalescence.

In conclusion, I have endeavoured to show that the group of cases related (with the possible exception of Case I) has distinct features, probably due to an ascending infection of the bile-ducts. It must be differentiated from acute yellow atrophy, malignant jaundice and late chloroform poisoning.

ADDITIONAL BIBLIOGRAPHY.

BARDINET. *L'Union méd.*, 1863, pp. 242, 265.

HECKER, C. "Ueber einen Fall von acuten gelben Leberatrophie bei einer Schwangeren," *Monatschr. f. Gebürtsk.*, 1863, xxi, p. 210.

LOMER. "Ueber die Bedeutung des Icterus gravidarum für Mutter und Kind," *Zeitschr. f. Gebürtsh. u. Gyn.*, xiii, p. 173.

LEVINOWITSCH. "Bacteriologische Untersuchung des Blutes bei Eclampsie," *Centralbl. f. Gyn.*, 1899, xxiii, p. 1385.

LEE, H. J. "A Case of Icterus gravis following Confinement at Term," *Cleveland Med. Journ.*, 1911, x, p. 461.

M'GIBBON, J. "Fatal Cases of Jaundice in the New-born Child, with Note of a Case in Successive Pregnancies," *Trans. Edin. Obstet. Soc.*, 1912-13, xxviii, pp. 285-301.

ROLLESTON, H. D. "Diseases of the Liver, Gall-bladder, and Bile-ducts," 1912, p. 575.

ROUVIER et LAFFONT. "Ictère émotif au cours de la grossesse, accouchement avant terme : ictère grave ; mort de la mère," *Bull. Soc. d'Obstet. et de Gyn. de Par.*, 1912, i, pp. 383-385.

STEWART, GRAINGER. "On Acute Yellow Atrophy of the Liver," *Edin. Med. Journ.*, 1865, xi, p. 323.

STROGANOFF. "Ueber die Pathogenese der Eclampsie," *Zeitschr. f. klin. Med.*, 1900, xxxix, p. 503.

TYLECOTE, F. E. "Jaundice of Pregnancy associated with Jaundice of Offspring," *Med. Chron.*, 1913-14, p. 465.

VALLOIS et DALMAS. "Ictère et Grossesse," *Bull. Soc. d'Obstet. et de Gyn. de Par.*, 1911, xiv, p. 404.

WINTER. *Trans. Washington Obstet. Soc.*, 1889-90, iii, p. 1.

DISCUSSION.

The PRESIDENT: It is noteworthy that only five cases of hepatic toxæmia have occurred in a total of 2,000 deliveries. From this fact I infer that a special combination of morbid conditions is needed to bring about the storm. Again, the rapid fatality in two of the cases and the milder attack in those which recovered suggest the same idea of varying intensity of combination. In formulating any theory three factors must be considered: (1) The changes in the liver cells associated with fatty metamorphosis; (2) the action of toxic substances ascending by way of the bile-ducts from the intestine; and (3) the influence of chloroform as a determining cause. Chloroform as a "primary" cause can be put out of court, for otherwise these cases would occur more frequently, but the drug may help sometimes to precipitate an attack by encouraging acidosis. Sir Lauder Brunton has taught us that an important function of the liver is to deal with poisons entering the portal circulation from the intestinal tract, and to prevent them from passing into the general circulation. Such poisons may be in such excess as to destroy the hepatic structure and functions, as in the case of acute yellow atrophy, or the liver may be functionally inadequate to deal with these poisons, though the latter are only present in such quantities as may be easily disposed of by healthy organs. Regarded from this point of view acute yellow atrophy is not a disease of itself but merely represents the most severe degree of hepatic toxæmia. Time does not permit of a discussion regarding the changes which take place in the hepatic cells, but physicians and pathologists are in agreement that fat storage and fat infiltration are marked in the liver as well as in other organs during pregnancy. The influence of these changes on the resisting power of the liver tissue is obvious. I have had two cases of hepatic toxæmia in my own practice, and I would lay stress on the fact that in both instances signs and symptoms of intestinal disturbance manifested themselves for some days before the onset of severe disease. I agree with Dr. John Phillips that the mischief is started by intestinal disease and spread along the line of the hepatic vessels and ducts. Fatty metamorphosis and chloroform inhalation are possibly additional factors in determining the onset and severity of the symptoms.

Dr. AMAND ROUTH: The title of Dr. Phillips's paper might be altered to "Toxæmia in Pregnancy affecting the Liver," for I think true pregnancy toxæmia begins in the cells of the chorionic villi, and affects different secreting or glandular organs, according to the type of toxin or the condition of the patient's organs. The question of the efficiency of the antitoxins formed to counteract the physiological toxins has also to be considered. Possibly the antitoxins, if in excess, may cause a true toxæmia. Most of Dr. Phillips's cases have been associated with *Bacillus coli* cystitis, and in such cases the liver troubles may be due to ascending intestinal infection by the same organism or by toxins derived from those bacilli. If so, those cases are not due to true "toxæmia of pregnancy," but, directly or indirectly, to infection.

Dr. EARDLEY HOLLAND: I am glad Dr. John Phillips has reported these cases, as they are of extreme importance, and I am certain that now attention has been directed towards them they will turn out to be not uncommon. I have met with two similar cases in the course of one week, and on discussing them with some of my obstetrical colleagues, I found that they also had occasionally met with or had heard of similar cases. The first of my cases was that of a primipara, aged 43. She had been well during pregnancy, and had a prolonged labour, terminated by the forceps, during which she had about three hours of chloroform anæsthesia. Immediately after delivery she vomited about two pints of dark blood and became drowsy, slightly jaundiced and was occasionally sick. The motions also contained a small amount of tarry blood. I saw her three days after her confinement, and found her jaundiced, mentally dazed and dull, with normal temperature and pulse. She was restless and complained of great thirst. There were no abnormal physical signs on abdominal or pelvic examination. The urine contained large amounts of acetone and diacetic acid. Delayed chloroform poisoning was diagnosed and she was treated by copious rectal injections of sodium bicarbonate and dextrose. Within three days she was well. A few days later she had a rigor and a raised temperature, and passed through a prolonged illness, due to *Bacillus coli* infection of the uterus and of the urinary tract, but she ultimately made a complete recovery. The second case was that of a primipara, aged 23. Six weeks before the full term of pregnancy she had a slight ante-partum hæmorrhage. For the next two days she was occasionally sick, the vomit containing a little blood and looking "liverish." Labour commenced and a dead child was born three days after the occurrence of the hæmorrhage. She was given a great deal of chloroform during labour and had been examined under chloroform about a week previously. On the day after labour, jaundice appeared and gradually deepened. She became drowsy, restless, thirsty and wsa constantly sick. I saw her on the fourth day after labour, by which time she had become comatose. The urine was high-coloured, scanty, and contained much acetone and diacetic acid. In spite of intravenous and rectal infusions of sodium bicarbonate and dextrose, she became worse and died a week after labour. I believe both these cases are examples of delayed chloroform poisoning, and I believe that some, if not all, of Dr. Phillips's cases are of the same nature. I have noticed that pregnant women are extremely prone to get acidosis; for example, in cases of vomiting in pregnancy I have noticed that acidosis makes its appearance much more quickly and in much greater degree than in cases of vomiting in non-pregnant women. In fact, since my experience with these two cases, I have always given my patients who have had chloroform during labour a mixture of glucose and sodium bicarbonate as a prophylactic against chloroform poisoning. I believe Dr. Phillips's cases, and all similar, form a distinct clinical and a distinct pathological entity. Whether they are associated with *Bacillus coli* infection or not, whether they have had much or little chloroform, a post-mortem examination will reveal as the principal change necrosis of the liver cells, similar in character, though of course differing in degree. No doubt there is a "liver of pregnancy" just as there is a "kidney of pregnancy"; a pregnant patient whose liver becomes the seat of such "pregnancy changes" would be liable to get more extensive changes, leading to the clinical picture described this evening, if conditions arise which throw extra strain on the liver; and the administration of chloroform is notorious for producing this effect. A severe *Bacillus coli* infection may possibly have the same effect, though I believe the *Bacillus coli* infection is a secondary event. I believe the lesson to be learnt is that chloroform is never a really safe drug during pregnancy, and is extremely dangerous in patients who have had the "liver changes of pregnancy" shortly before or during labour. I cannot suggest any means of diagnosing "liver changes" in pregnant cases, but I think it of great importance to test the urine of pregnant women for acetone bodies before giving them chloroform, and to give all patients as a routine measure plenty of dextrose and sodium bicarbonate after the anæsthetic, as a prophylactic against any possible harmful effect.

Dr. H. WILLIAMSON: The thanks of the Section are due to Dr. Phillips for focusing attention upon a group of cases which are occasionally met with in practice and which give rise to a considerable degree of anxiety. I am not, however, able to accept the suggestion of Dr. Phillips and Dr. Holland that the group of cases reported in the paper constitute a clinical entity. I agree that they are cases of toxæmia and that the toxins have evidently produced severe hepatic lesions; if that is what is meant by "hepatic toxæmia," the title of the paper adequately designates the group of cases described. Clinical and pathological observation suggest that during pregnancy the liver appears to be peculiarly susceptible to the action of toxins, and it is clearly established that the incidence of acute yellow atrophy is much greater in the pregnant than in the non-gravid state. Dr. Phillips's cases support my view, that, given the susceptibility, the actual lesions may be set up by a variety of toxic agents such as poisons produced by the epiblastic tissues of the chorionic villi, poisons produced by the *Bacillus coli communis*, or chemical poisons such as chloroform. I think that all these three groups are represented in the collection of cases reported by Dr. Phillips. I have seen two cases of jaundice associated with vesicular mole, and these cases suggest that the toxin responsible was a placental toxin allied to those of the kidney of pregnancy, toxic vomiting and eclampsia. The importance of infections by bacilli of the coliform group is well demonstrated by a case recently under my care in the lying-in ward of St. Bartholomew's Hospital. A patient was admitted with bilateral pyelo-nephritis, and from the urine pure cultures of a coliform bacillus were obtained. She was very ill, and in spite of evacuating the uterine contents the temperature remained high and she passed into a drowsy comatose condition. From a blood culture the same coliform bacillus was recovered; in the course of two or three days she became jaundiced and died ten days after admission. Post-mortem, extensive areas of necrosis were found in the liver, and the coliform bacillus was grown from the liver tissues. Cases such as those I have just cited seem to indicate that the hepatic toxæmias do not all belong to one group.

Dr. JOHN PHILLIPS (in reply): Dr. Routh finds great difficulty in defining "toxæmia," and I think that is the general feeling. I quite agree with Dr. Williamson that the five cases described are capable of subdivision, and that Case II was in all probability a case of late chloroform poisoning. The term "ascending toxæmia" is given to those cases for want of a better term.

BOUND
JUN 4 1917
UNIV. OF MICH.
LIBRARY

UNIVERSITY OF MICHIGAN
3 9015 00602 6325